MEETING REPORT
INTERCAFE @ Saxony 01-03 October 2005

"Commercial Carp Aquaculture"

INTERCAFE Meeting Report, Saxony, Germany, October 2005

D. N. Carss & M. Marzano (Editors)

This full report of the meeting is in six parts: (1) Work Group 1: Ecological databases and analyses; (2) Work Group 2: Conflict management and resolution; (3) Work Group 3: Linking science with policy and best practice, (4) Report on field trip, including Q&A session with local stakeholders, (5) Carp pond sub-group report, (6) Interdisciplinarity – progress report. An example of the datasheet available to input data into the Water Systems Database is given in Appendix 1.

PART (1) Work Group One: Ecological databases and analyses

Drafted and compiled by Stef van Rijn, Mennobart van Eerden, Jean-Yves Paquet and Stefano Volponi

Participants: Ian Russell, Bruno Broughton, Catarina Vinagre, Kareen Seiche, Botond Kiss, Loïc Marion, Szymon Bzoma, Stefano Volponi, Stef van Rijn, Mennobart van Eerden, Josef Trauttmansdorff, Mikael Kilpi, Marijan Govedic, Svein-Håkon Lorentsen, Ivailo Nikolov, Janis Baumanis, Renata Martincova, Michal Adamec, Jean-Yves Paquet.

Work Group One primarily undertook four activities during the Saxony meeting and these are described below.

(1) Field trip analysis

WG1 members spent a considerable amount of time focusing on ecological aspects in relation to cormorant presence in the whole carp pond area. Taking into account basic data on cormorant behaviour and ecological requirements, as well as information on the water-system in the study area gathered both during the field trip (carp producers, ecologists, ornithologists) and published information (report and papers), WG1 members devised a simple predator-prey model useful to: (i) estimate roughly the overall fish biomass removed by predation, predated biomass of carp and other fish of commercial value, potential economic impact of cormorant predation and (ii) correlate these estimates to factors that affected:

(a) the carp industry **negatively** such as the change of production techniques (e.g. the dramatic increase of fish density and use of artificial food from the old traditional extensive production in the Middle Age to the modern intensive production), the increase of commercial competition from more eastern related to the increase of recurrent production costs (e.g. manpower, energy, etc.), the change of consumer demand (shifting to more valuable sea fish), the decrease of water quality;

(b) the local abundance of fish-eating predators (both birds and mammals) **positively** due to the overall increase of their population in central and north

Europe, the local increase in fish density at the carp ponds, and the progressive large increase of water-body availability due to the filling of open coal mines.

Apart from putting on the paper some simple estimates of numbers so as to quantify the size of the numerous interacting parameters, this exercise was also useful as a basis for drawing different scenarios for the management of the carp aquaculture in relation to (a) the likely further development of the cormorant population (and those of other fish-eating predators) on a local and regional/continental scale, (b) the use of funds for the reimbursement of damage and (c) losses due to fish-eating predation. The full report from WG1 (coordinated by Mennobart van Eerden) is incorporated into the field trip report (Part 5).

(2) Current status of the Water System Database: preparation and analysis

Stef van Rijn and Mennobart van Eerden presented the current state of the water system database. As already discussed in Gdansk, the aim of this water system database is to investigate the ecology of cormorants at the continental level, particularly their temporal and spatial status and distribution and choice of breeding roosting and foraging sites. Analysis of these data at the continental scale in relation to ecological characteristics (e.g. geographical, climatological, biological – size, nutrient status, fish communities etc) through a Geographic Information System will provide better understanding of current cormorant distribution across Europe and could also allow predictions of their future distribution. Furthermore, this improved understanding in relation to ecological system characteristics would enable the investigation of site-choice (i.e. breeding, foraging) by cormorants and could lead to more effective widespread management options.

Stef and Mennobart presented the current status of the database, consisting of unanalysed data gathered during the REDCAFE project and of new data provided by INTERCAFE participants (in the same format as the REDCAFE data). Mennobart insisted that all possible data should be gathered at the start of the analysis, and that every participant should now be aware that it would not be possible to come later with more data to be added in the analysis. The deadline for providing the data was fixed by WG1 participant to be 15 December 2005.

In order to be as representative as possible of the main water system types in Europe, and to attempt to obtain a representative coverage of the distribution of case-studies in Europe, work in Saxony consisted mostly of a careful examination of the currently available water system case studies in the database, in order to determine which water system examples were needed for each country. Figure 1 illustrates the partition of case studies already in the database and also the required number of case studies (according to water system type) as was decided during the meeting. It can be seen from the figure that three habitat types were particularly in need of new case studies, namely open sea systems, small rivers and impounded rivers.

The Figure 2 shows the current geographical distribution of case studies across Europe in the Database. At present, case studies are not well distributed and there is a particular lack of data from France, the southern Iberian Peninsula, some eastern countries and Scandinavian ones. However, recently provided data (e.g. some north

German cases not yet incorporated into the database) will contribute to reducing the geographical biases.

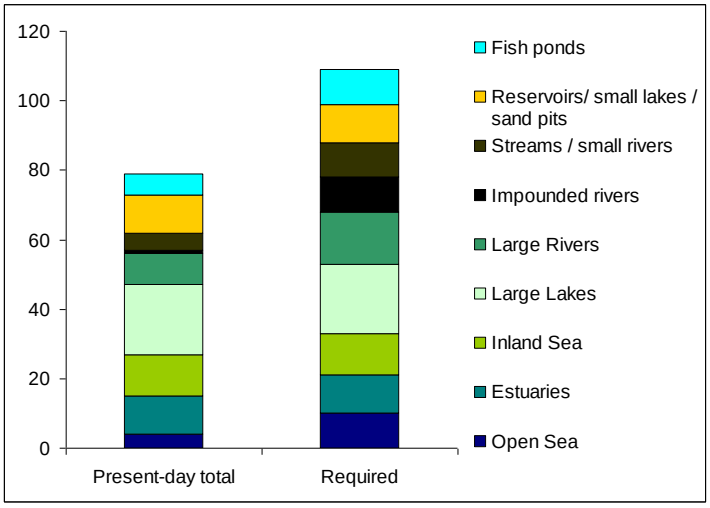


Figure 1: Current (present-day) and required partition of habitat types in the Water System Database.

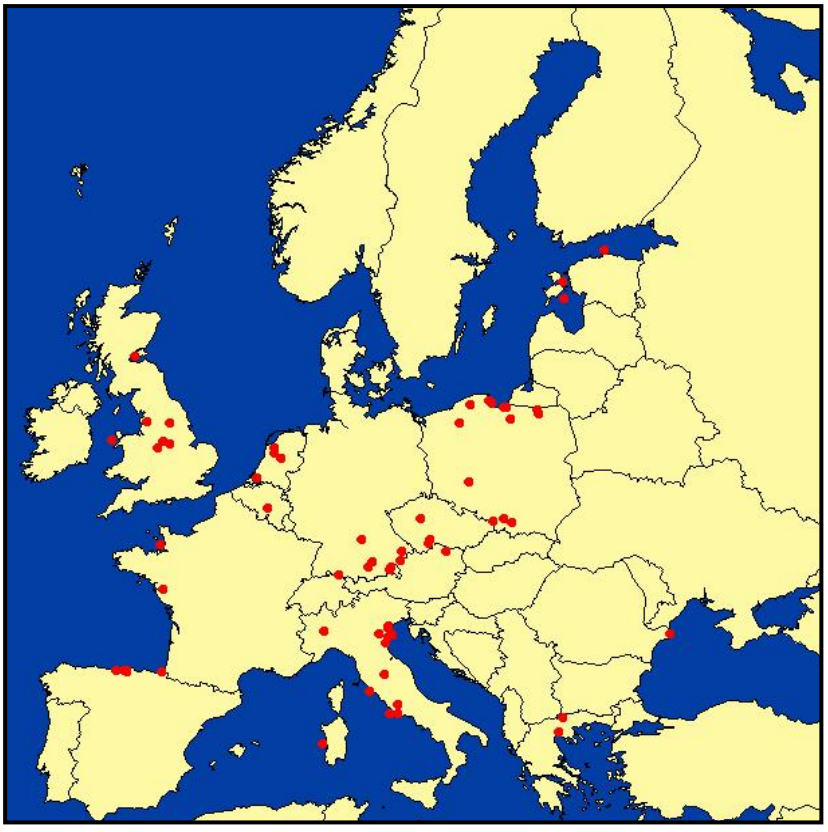


Figure 2: Geographic distribution of Water System case studies in the Current Database (to be updated).

Using the information shown in Figs. 1 and 2 WG1 discussed the distribution of data required for each country. Table 1 shows the number of case studies still needed by

WG1 for each country and each water system type. In some instance, no responsible person could yet be attributed but most case studies to be provided were associated clearly to a person in the group.

	AU	B	CZ	SK	EST	F	D	GR	I	NL	PL	RO	ES	CH	UK	S	FIN	DK	N	PT	SLO	LV	LT
Open Sea							1			1						1	5	2	2				
Estuaries						1	1						1						1	3			
Inland Sea											1	1											1
Large Lakes	1				1		2		2							2	1						
Large Rivers				1		3				1			2										
Impounded rivers	1											1									1		
Streams / small rivers	2	1		1		2			2					2							4		
Reservoirs/ small lakes / sand pits		1										1	2				2			2	1		
Fish ponds		1				1	2																1

Table 1: "Wishes" of WG1 concerning the case studies to be provided by INTERCAFE participants by 15 December 2005. In red are those for which no clear responsible person was identified during the meeting.

WG1 HOMEWORK

The responsible people for the case studies to be provided, as decided during the meeting, are detailed below:

- Josef Trauttmansdorf to provide data about Neusiedersee and two small river systems.
- Jean-Yves Paquet to provide data concerning one large fish pond, a reservoir and a small river in southern Belgium.
- Mennobart to ask for data about one large lake system in Estonia.
- In Germany, the work is ongoing and most data will be provided soon. WG1 needs one large estuary (Elbe?), open sea system and 2 fishponds. The Saxony case studies will be included in the database (based on WG 1 work after the field trip).
- Mikael Kilpi to provide 5 open sea cases, 1 large lake and 2 small lake cases from Finland.
- Mennobart and Stef to provide one open sea and one large river case from the Netherlands.
- Szymon Bzoma to provide one inland sea case from Poland (Szeczin area). A lot of fish data are also available for many other places in Poland, so more case studies could possibly be added.
- Botond Kiss to provide data about Prût river (impounded river), 1 small river and 1 inland sea from Romania. He will also try to obtain data from Hungary, not currently participating in INTERCAFE.
- Catarina Vinagre to search for data from Spain, where she can obtain fish data. Mennobart and Stef, possibly using their own data or data from the 2003 pan-European count, could help with Cormorant data.

- Catarina Vinagre to provide data from Portugal (Rio Formosa, Tagus estuary, etc).
- Mennobart will try to find data, through Erich Staub, about Switzerland (2 small rivers).
- Mikael Kilpi to ask Swedes (Henri Engström) for data about 2 open sea systems and 2 large lakes.
- Denmark and Norway are asked to provide more cases about open seas and estuaries.
- Marijan Govedic to provide Slovenian data (small rivers, small lakes and one impounded river).
- Mindaugas Dagys to provide Lithuanian data on fishponds and one Inland Sea.
- Ana Afonso Polyviou is asked to provide if possible one case study from Cyprus (open sea?).
- Ivailo Nikolov to provide more data on Bulgaria (small rivers, large lakes and open sea).

An example of the datasheet available to input data into the Water Systems Database is given in Appendix 1 (electronic copies available from Stef and Mennobart at RIZA)

(3) Status of Cormorant Breeding Colonies in 2006

Following the news reported by the INTERCAFE Chair at the Management Committee meeting (see Part 4), i.e. the budget available for the 2006 will not allow the organisation of any short term scientific missions, and the difficulties - at least in the short term - to apply or find extra financial resources outside the Cost Action, the attention of the WG1 members was focused on the difficulties to carry on and promote co-ordinated colony surveys in some countries. This is the case, for example, in Romania and Bulgaria which host significant cormorant populations. For Romania, during the Gdansk meeting in April 2005, it was estimated that 3,500-4,000 Euro would be needed to effectively cover the area of the Danube Delta, one of the most important for breeding cormorants in Europe. For Bulgaria, and inland Romania, constraints related to lack of resources and expert personnel suggest it will be impossible to cover the whole Danube river course where several colonies have been reported already in the mid 1990s and no updated information since then has been available.

Other countries that may have difficulties in carrying out the colony count in 2006 are Sweden, Poland and, among those not covered by the INTERCAFE, Albania, Hungary, the former Yugoslavia, and Ukraine. For Poland and Sweden, which host large cormorant numbers, difficulties are due to the wide distribution of the colonies all over the countries and the lack of resources to organise several operating teams. For countries outside INTERCAFE, some contacts have been made with local researchers and bird organisations, but at the moment a good coverage of the whole colony area is in doubt.

Several INTERCAFE participants will attend the 7th meeting of the Wetlands International Cormorant Research Group (23-26 November 2005, Villeneuve, Switzerland), which offers a further occasion for work on the project organisation for the 2006 breeding census and the search for a wider co-operation. The field form to collect standard data on the breeding colonies will be presented at the CRG meeting as well as instruction for colony counts that are under preparation by two members of WG1.

(4) Historical Database of Cormorant Breeding Colonies

During a plenary session Stefano Volponi first reported on the current status of the historical colony database showing a table summarising the country by country data so far gathered. The database has been designed to contain information useful not only for documenting the change of colony distribution and population development in Europe, but even for feeding into the Water System Database and providing layers for GIS analysis.

Thus the historical database is aimed at gathering referenced information on colony distribution, size, habitat, cormorant/colony management measures, date references. For this a MS-Access database containing five related tables has been prepared and filled with data so far available. As can be seen in Table 2 below, most of the data so far collected refer to colony location and size - still lacking are information on habitat characteristics and management. Because most of the data included in the database come from a variety of papers and reports (un)published in a long period of time, these "accessory information" are not always easy or possible to find.

During the meeting the sub-group leader met both WG1 and WG2 members from different countries to discuss data already delivered (e.g. Janis Baumanis for Latvia, Loïc Marion for France and Robert Gwiazda for Poland) or potentially available for their country, as well as collect new additional data. Savas Kazantzidis and Mindaugas Dagys gave data on colony size and location respectively for Greece and Lithuania. Nils Røv (Norway), Erik Petersson (Sweden) and Robert Gwiazda provided published papers and references on colonies in their countries. Other participants from Czech Republic, Estonia, Finland, Germany, Norway, Slovakia, The Netherlands, took the task of delivering (quickly!) further available data.

Natonal contacts	Intercafe	Country	Locality	Size	Habitat	Management	References	Period covered	Notes
	N	Albania							
Josef Trauttmansdorf	Y	Austria	Y	Y	N	N	Y	historical estinguished colonies	no data on colonies established in 2003
Irina Samusenko	N	Belarus	Y	Y	N	N	N	updated to 2001	
Jean-Yves Paquet	Y	Belgium	Y	Y	N	N	Y		
	N	Bosnia Herzegovina							
Ivailo Nikolov	Y	Bulgaria	Y/N	Y/N	N	N	Y/N	up to 1990s	scattered data from literature
	N	Croatia							
Petr Musil	Y	Czech Republic		N	N	N	N		data under preparation
Thomas Bregnballe	Y	Denmark	Y	Y	N	N	Y	updated to 2001	data from 1965 onwards
Vilju Lilleleht	Y	Estonia	N	N	N	N	N		
Mikael Kilpi, Timo Asanti	Y	Finland	Y/N	Y/N	N	N	N	updated data on regional level	updated data on regional level
Loic Marion	Y	France	Y/N	N	N	N	N	scattered data	available last national counts
Thomas Keller	Y	Germany	Y	Y	N	N	Y	updated to 2003-2004	
Savas Kazantzidis	Y	Greece	Y	Y	N	N	Y	scattered for several colonies	repoted all available data
	N	Hungary							
	Y	Ireland							
Stefano Volponi	Y	Italy	Y	Y	Y	N	Y		
Janis Baumanis	Y	Latvia	Y	Y	N	N	N	mostly updated to 2002	
Mindaugas Dagys	Y	Lithuania	Y	N	N	N	N	available 2001	available last national counts
	N	Montenegro							
Stef van Rijn	Y	Netherlands	Y	Y	N	N	N	available up to 2000	data 2001-onwards under preparation
Svein-Akon Lorentsen	Y	Norway	Y	N	N	N	Y		data under preparation
Robert Gwiazda, Szymon Bzoma	Y	Poland	Y	Y	N		Y	good data up to 1995 then scattered	more data available in 2006
Botond Kiss	Y	Romania	Y/N	Y/N	Y	Y	Y	for the Delta last data available 2002	scattered data outside the Delta (1990s)
	N	Russia							scattered data from literature
Marco Tucakov	N	Serbia							
Michal Adamec	Y	Slovakia	N	N	N	N	N		
	N	Spain	N	N	N	N	N		
Henry Hengstrom	Y	Sweden	Y	Y	N	N	N	good data up to 1995 then scattered	
Verena Keller	N	Switzerland	Y	N	N	N	N	first breeding in 2001	new data delivered at Villeneuve meeting
	N	Turkey	N	N	N	N	N		
	N	Ukraine	N	N	N	N	N	up to 1990s	scattered data from literature
	Y	United Kingdom	N	N	N	N	N		some scattered data from literature

Table 2: Current status of the historical database of Cormorant breeding colonies (Stefano Volponi)

(5) Cormorant Manual

Josef Trauttmansdorf, who is in charge of co-ordinating the manual preparation, reported on the current status of the manual and showed a draft copy of the sections written so far. After constructive discussion, members of the working group agreed on the contents of both the manual in general and the different sections in particular, although it was recognised that some topics needed to be further discussed among most experienced people to gain general consensus and shared standardised methods. Thus, after the proposal of Marijan Govedic and Josef Trauttmansdorf, two additional working sessions during the Saxony meeting for further discussions on standardising four methodologies

Defining standard methods to (1) **measure fish diagnostic structures** (e.g. cyprinid pharyngeal bones) for cormorant dietary studies and (2) chose **the most appropriate allometric relations** between diagnostic structures and size/weight of the fish prey.

These discussions involved: Szymon Bzoma, Marijan Govedic, Robert Gwiazda, Josef Trauttmansdorf, Stefano Volponi.

Considering point (1), Marian asked participants who had experience of arranging their own reference collection of bone and other fish structures and carrying out diet analysis, to show how they take the most used measures of bone length/width; this experience showed that different people take the same measure in different ways. This may be not a problem when everyone uses his/her own data, but causes difficulties when measurements are shared between researchers and measurements within studies are carried out by different teams.

Considering point (2), by the critical reading of a methodological review on regression analysis, Marijan drew attention to the need to use the most appropriate equations to correlate diagnostic bone measurements to fish body size and weight; these equations are often used to first estimate individual prey size and then (through summation) to estimate the biomass removed by predation. Results of the discussion will be included in the manual as working recommendations.

Defining standard methods to (3) **best conduct winter counts at night roosts** also considering different roost site location and habitat characteristics; (4) **take biometric measurements** - how to maintain carcases, take and report (form, content) biometrical measures from dead specimen dissected in laboratory. These discussions involved: Josef Trauttmansdorf, Rosemarie Parz-Golner, Jean-Yves Paquet, Stefano Volponi.

From their long-term experience gained during national and international projects involving co-ordinated surveys at roosts, the participants reviewed the most important methodological aspects and constraints that should be considered for organising and conducting efficient counts. Rosemarie agreed to prepare, with the contribute of Jean-Yves, a draft of the section "how to count cormorants". The same agreement was found for writing the draft of the section "how to measure a dead cormorant" and to prepare a preliminary form for the collection of biometrical data from laboratory analysis.

The involvement of all the WG1 and 2 members was also confirmed for the provision of literature and material (drawings, pictures, data) useful for the editing of the different sections of the manual. Thomas Keller was asked to draft a "management" chapter showing different possibilities for protecting fish from cormorant predation. Ian Russell was asked to include some freshwater fish sampling techniques to chapter 6. Work on the manual will conmtinue immediately after the Saxony meeting – it is hoped a draft copy will be available for circulation (and comment) on the forthcoming INTERCAFE web site

Finally, in relation to **WG integrating activities**:

In the process of building interdisciplinary integration among the three working group, Stefano Volponi reported to WG2 on the Italian case studies. A summary of the talk entitled "*An overview of the Cormorant issues in Italy and conflict management in the River Po Delta (NE Italy)"* is available in the WG2 section of this meeting report. Considerable input is also required from participants in WGs 2 and 3 for the various databases that WG1 are compiling, and for information for – and comments on – the Cormorant Manual.

PART (2) Work Group Two: Conflict management and resolution

Drafted and compiled by Bruno Broughton & Thomas Keller

Participants:

Kareen Seiche, Susana França, Bruno Broughton, Ian Russell, Ger Rogan, Daniel Gerdeaux, Bernard Breton (special invitation: President of European Anglers' Association), Robert Gwiazda, Petr Musil, Savas Kazantzidis, Ion Navodaru, Tamir Strod, Yonathan Harari, Timo Asanti, Redik Eschbaum, Mindaugas Dagys, Nils Røv, Henrik Lykke Sørensen, Linas Lozys, Thomas Keller.

Introduction - Thomas Keller

WG2 in Saxony will start with Ian's work on 'definitions'. Next we want to switch over to Daniel's collection of information on the 'legal frameworks'. The third block during this meeting will be presentations on Cormorant management in different European countries, i.e. Austria, the Czech Republic, Bulgaria, Italy, Denmark, and Norway. Presentations like these are to be continued throughout the next meetings until all countries with management plans are covered. The idea is to identify common patterns that help us understand why certain techniques are effective at one site and more or less ineffective at others as shown in the REDCAFE (*Pan-European Overview*) report. Factors for this may include the number of birds present, geographic location, and climate. As one outcome of our work in WG2, a manual on management techniques, their effectiveness, practicability, acceptability and costs, is planned. The booklet of the Moran Committee already gives a lot of information. We should build on this, but broaden its view, i.e. cover more types of water bodies, in order to achieve a pan-European understanding.

Work Group Two primarily undertook eight activities during the Saxony meeting and these are described below.

(1) 'Definitions' - Ian Russell

It was agreed previously that there was a need to establish and maintain a common understanding of relevant terminology and definitions among the participants, notably '*favourable conservation status'*, '*sustainable fishery'*, '*serious damage*' and '*successful conflict resolution'*.

(a) 'Favourable Conservation Status'

The EU Habitats Directive defines *favourable conservation status* as:

> *"A range of conditions for a natural habitat or species at which the sum of the influences acting upon that habitat or species are not adversely affecting its distribution, abundance, structure or function throughout the EU in the long term." i.e. "The condition in which the species (or habitat) is capable of sustaining itself on a long term basis."*

It recognises that *favourable conservation status* is achieved if:

a) a species maintains itself as a viable component of its natural habitat,
b) the natural range of the species is neither being reduced nor is likely to be reduced in the foreseeable future, and
c) there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis.

With regard to Cormorant/fishery conflicts, it is important to recognise that favourable conservation status arguments might be applied to both Cormorants and to fish and fisheries. The Precautionary Approach is central to environmental management issues and requires that: "*where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation*."

In practice, where precautionary arguments apply to both sides of an argument, there is a requirement for a balanced approach.

BirdLife International has developed a system that differentiates between species with 'favourable' and 'unfavourable' conservation status. The conservation status of a species is regarded as unfavourable if it was classified as: **endangered, vulnerable, declining, rare, localised** or **insufficiently known.** The conservation status of a species was regarded as favourable only if it was classified as **secure** in the long-term.

Under the above scheme, the conservation status of a species was evaluated as favourable or unfavourable based on a combination of population size and trend (Table 3).

Table 3: Allocation of conservation status in 'Birds in Europe'

	European Population Size			
Trend	**<250 pairs**	**<2,500 pairs**	**<10,000 pairs**	**>10,000 pairs**
Large decline	**Endangered**	**Endangered**	**Endangered**	**Vulnerable**
Moderate decline	**Endangered**	**Endangered**	**Vulnerable**	**Declining**
No decline	**Endangered**	**Vulnerable**	**Rare**	**Secure**

However, a legal interpretation of the Birds Directive is that it operates as a 'Standstill Clause' – i.e. it fixes favourable conservation status at the time of implementation of the Directive and does not provide for it to be regarded as an 'ever changing now'. If species were not classified as 'threatened' (IUCN categorisation) at that time, then this historical reference point could be adopted as a minimum target. However, if a species was already threatened at this point, an appropriate target could be to bring the species back to a more favourable conservation status by supporting its recovery.

(b) 'Sustainable Fisheries'

It has been common practice to use the term 'sustainable' with reference to the yield that can be removed from a fish stock in perpetuity. The FAO Code of Conduct for Responsible Fisheries advises that "*States and sub regional or regional fisheries management organisations should adopt appropriate measures, based on the best scientific evidence available, to maintain or restore stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors."* The Code further notes that *"States and sub regional or regional fisheries management organisations should introduce measures for depleted resources, and those resources threatened with depletion, that facilitate the sustained recovery of such stocks."*

However, the sustainability of a fish stock is also affected by its habitat and its interrelationship with other plant and animal species. Increasing emphasis is therefore being placed on an ecosystem approach to fisheries (EAF) as a means of achieving sustainable development in a fisheries context. The application of EAF seeks to implement sustainable development concepts into fisheries by addressing both human and ecological well-being.

Thus, the FAO indicate that the purpose of an ecosystem approach to fisheries is "*to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardising the options for future generations to benefit from the full range of goods and services provided by aquatic ecosystems."* EAF has been defined: "*An ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries."*

In managing fishery resources, managers need to consider the state of the resource and the provision of fishing opportunities. Satisfactory fishing depends on the presence of healthy fish in appropriate numbers; regulation of fisheries cannot be considered in isolation from the ecosystems of which the fish are a part; and, as a basic principle, fish should come first, i.e. before the exploiters.
The word '*fishery*' has a range of meanings, which are important in understanding the Cormorant/fishery conflicts:

- to ecologists it means the ecosystem including its fish, whether or not these are fished for;
- to fisheries managers it means the enterprise managed;
- to fishermen it means the place where they fish; and
- to policy makers it means the sphere of activity covered by the relevant law.

Conflicts might therefore be viewed at:

- the ecosystem level - as changes in fish stock size or species composition;
- the 'enterprise' level - as reduction in fishery income; and/or
- the resource/individual level - as reduction in amenity value.

(c) 'Serious Damage'

The EU Birds Directive provides a common framework for the protection of wild birds, but provides derogations for birds to be killed for various reasons, including 'preventing serious damage to fisheries'. This *serious damage* derogation requires, in the first instance, that there is 'no other satisfactory solution' to the problem. The derogation also:

- infers an economic interest; is intended to prevent damage (i.e. it is not a response to already proven damage); requires a reasonable basis for concluding that damage will be serious in the absence of action.

In making derogations under the Directive in respect of Cormorants, States are therefore required to assess *serious damage* at fishery sites. However, *serious damage*

is notoriously hard to define. Further, balancing fisheries and conservation interests is not easy, as it is difficult to assess the relative importance of species protection against a socio-economic demand.

UK research concluded that Cormorants were a problem for specific fisheries rather than a general problem, with depredation levels being high enough to cause a decline in the fishery at some sites, but not others (see also chapter 26, pp326-354, *REDCAFE: Summary & National Overviews* report). It was further concluded that it was not possible to define a single level of depredation, in terms of the proportion of the standing crop removed by birds, which could be used as a threshold for assessing whether losses were *serious*. Site by site evaluation of Cormorant/fishery conflicts was therefore required.

In addition, quantifying fish stock sizes and predicting possible changes are, at best, very difficult (see also chapters 1 [pp23-27] and 4 [pp78-102], *REDCAFE Pan-European Overview* report). As a result, even detailed scientific Cormorant/fishery conflict case studies often have difficulties in unequivocally demonstrating 'cause' and 'effect' with regard to these predator/prey interactions. It might further be noted that damage may occur in a variety of ways, and assessments of whether such effects are serious will depend upon the value put on that aspect of the resource and on how 'the fishery' is categorised, for example at the resource, ecosystem or individual level:

In practice, assessing *serious damage* inevitably involves some subjective evaluation on a case-by-case basis. Given the complexity of the issue, and that detailed assessments on a site by site basis would be impractical, a pragmatic approach is commonly applied by States in the licensing process.

(d) 'Successful Conflict Resolution'

It is clear that 'people-wildlife conflicts' typically involve antagonism because different individuals or groups that are competing for the same resources. As a result, it is important that human:human interactions and differences receive equal attention in working to resolve Cormorant/fishery conflicts. The REDCAFE report (*Pan-European Overview*) noted that successful management of such conflicts is often complicated by the fact that they occur at a variety of scales: local, regional, national and global. REDCAFE further noted that: '*above all, successful conflict management depends on conflicting parties opening communication channels and developing networks of trust for effective collaboration and dialogue.'*

Conflict resolution has been defined as 'harmonisation of the incompatible'. *Successful conflict resolution* can be defined as achieving this goal.

Discussion:

- Nils: The 'favourable conservation status' depends on the species range, sub-species, and population size.
- Thomas: For a colonial breeding species 10,000 breeding pairs may be too low to secure a 'favourable conservation status' as most birds are breeding in clumps or aggregations, i.e. in a rather small number of big colonies.
- Bruno: 'Sustainable' means: How much can we leave? 'Sustainable Fishery' does not mean maximum yield. It must allow for natural changes.
- Tamir: Cormorant management must be acceptable and sustainable.

- Daniel: The damage must be acceptable, i.e. in France, Grey Heron damage is acceptable, but not Cormorant damage. This is based on a probability of risk.
- Thomas: In Germany it is understood that 'serious damage' in terms of the EU bird directive means 'serious damage' to fisheries in general or at least on a larger level, but not on the individual business level.
- Henrik: It should be added that the EU Bird Directive allows Cormorant derogations for conservation interests, e.g. Salmon conservation vs. Cormorants on the Danish river Skjern.
- Tamir: We cannot define the term 'successful'.
- Timo: We are more than 25 countries. Thus, we should try!
- Henrik: Maybe we should not try definitions but give/collect examples.
- Daniel: 'Successful conflict management': In France there is a 'sleeping conflict' between anglers and professional fishermen. There are only few complaints. This can be seen as a success.
- Thomas: From a political point of view 'successful conflict resolution' can mean that all stakeholders are equally happy or unhappy.

(2) 'Legal Frameworks' - Daniel Gerdeaux

Daniel presented a summary of the results from the questionnaire on the legal status and management of Cormorants. To date, information had been gathered for most participating countries except Austria, Czech Republic, Ireland, Portugal & Spain.

WG2 HOMEWORK

Participants from Austria, Czech Republic, Ireland, Portugal & Spain are strongly urged to send relevant information to Daniel as soon as possible

(a) Countries with Total Protection

These include:

- Belgium (Walloon Region) – some minor control since 1998
- Cyprus
- Finland
- Greece
- Latvia
- Netherlands
- Slovenia (small shooting quota since 2000)

(b) Countries With No Protection

There is no protection of Cormorants in:

- Estonia
- Romania (during the hunting season)

(c) Countries With A Management Plan

- France - since 1997, stabilisation of wintering birds by shooting. There is a shooting quota of 30,000 out of approx. 90,000 wintering birds

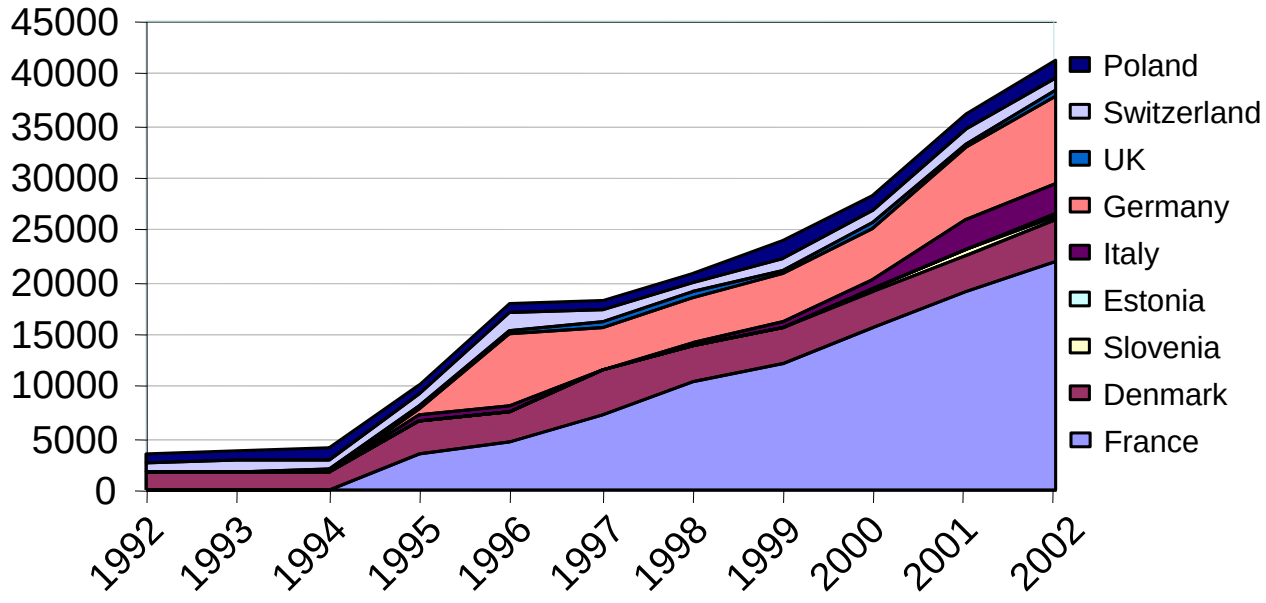
- Denmark – shooting within 100m of fishing gear, egg oiling, removal of new colonies
- England & Wales – licence to shoot as an aid to scaring; rules relaxed in 2004
- Switzerland – geographic regions designated as being either ***intervention*** or ***non-intervention*** areas, essentially giving protection to rivers and small lakes. Management Plan 2005 (following 'successful' 1995 plan) available at
- www.umwelt-schweiz.ch/imperia/md/content/gefisch/fischerei/kormoranbericht.pdf

- Poland – allows nests to be destroyed & some birds shot
- Italy – no national management plan, still protected under national hunting law, in several administrative regions shooting and nest destruction is allowed under derogation of the Birds Directive (Art. 9/1/a) to protect fish crops and wild fish populations, and in a few regions (now almost exclusively Veneto) shooting under derogation of Art. 9/1/c.
- German – a variety of measures which vary regionally

(d) Cormorant Culling – Trends

Figures were obtained for 10 countries for the birds killed in the period 1992-2003. These reveal (Figure 3) that the combined numbers of birds killed in these countries have increased from about 4,000 in 1992 to more than 40,000 in 2003.

Figure 3: Number of Cormorants reported killed 1992-2003.



(3) Case Study: Cormorants in Austria – conflicts focusing on river-systems - Rosemarie Parz-Gollner

The recent situation
Since the mid-1980s Cormorant numbers in Austria have increased with the Cormorant becoming a frequent migrant during winter months with a maximum of about 4000-4500 overwintering birds in the whole country – numbers depending on actual local climatic conditions and European-wide migration movements and temperatures. Cormorants have established new roost sites, mainly along big river-systems indicating their main migration routes, but the birds have also explored new feeding areas (smaller rivers) and showed a wider spatial distribution. Cormorants were breeding in Austria in former times and after a long period of absence the species returned recently as a breeding bird. Since 2001 new breeding attempts have been recorded, and recently (2005) two breeding sites have been established holding, together, approximately 90-100 breeding pairs.

Concern – focusing on rivers
It is not only bird-numbers that have increased during the last years. During the last decades there was also a sharp increase in numbers of fishing licences and therefore numbers of anglers, as well as an increase in fishery related interests for leisure activities in general. The official number of active anglers is approximately 200,000 including permanent licence holders and guests. Estimates given by umbrella organisations and public opinion polls talk about an overall estimate of 400,000 people being interested in fishing generally. This has lead to increased pressure on rivers as habitats, economic driven interests and management opportunities.

It is not only smaller rivers but also bigger river systems that have been the source of discussion recently. The group voicing greatest concern are private **anglers** with discussion concentrating mainly on **grayling** (*Thymallus thymallus*) and **trout** (*Salmo trutta*) regions. Fishermen (anglers) complain about the impact of increasing number of Cormorants on fish-communities and reproduction in general (species, age classes, biomass) and have asked for Cormorant regulations.

Habitat situation
There has been a change in environmental conditions with problems of river fragmentation. **Environmental change** in wetlands and rivers as habitats for aquatic animals shows the risks and the opportunities for animals as well as for humans. On one side the total number of water bodies (surface area) and many man-made wetlands have increased. Thus wetland related fauna also took advantage expanding in numbers and regions, sometimes significantly modified by humans. On the other hand the same locations attract humans, offering new, in many cases economic driven opportunities (leisure- and sport-activities, many opportunities for various management actions, commercial fish production, private angling).

Environmental changes - rivers
The Austrian Cormorant situation concerning the actual location of roosting-sites, phenology, number of migrating birds present during the winter months and the regional distribution mirrors to a great extent the environmental changes that have occurred. Birds tend to establish new roost sites and concentrate along the bigger, often dammed river-systems, which mostly are divided into sections (compartments).

Fish-migration from main rivers into tributaries in many cases is not possible due to **barriers** (e.g. built for energy production); also smaller rivers are often divided by man-made barriers. This increases the possibilities for Cormorants to feed successfully on fish stocks.

Cormorant regulation in Austria exists to scare and shoot Cormorants. These regulations are area- and time-restricted. The aim is primarily to protect endemic trout and grayling regions in rivers and to reduce the impact of fish-eating birds on fish species in general. Austria consists of 9 provinces - fishing, hunting and nature conservation laws are the responsibility of the provincial governments; so there are nine different possibilities and solutions for dealing with Cormorants. Due to the existing legislation, there is no overall solution on a national level.

Has it been effective to shoot Cormorants? Does it have mitigation effects?
Cormorant monitoring results obtained so far in some Austrian provinces indicate that the total sum of migrating birds on a provincial level has not decreased; no striking shifts of birds between regions within a province have been observed as a result of local shooting activities. On a local level (along certain river sections) a high effort in shooting activities can result in a temporally displacement as well as in a shift of Cormorant activities. At roost sites, flocks split into smaller groups and additional roost sites are founded in more secret (less disturbed) places and these sites are used alternately and occasionally by Cormorants.

The phenology and general distribution of wintering Cormorants seems to depend mainly on the overall climatic conditions within a geographic area (e.g. icing of standing water bodies during the winter months and free flowing, open water surfaces) as well as on the availability and accessibility of food in general.

Problems when dealing with the actual Cormorant – fisheries conflicts

- the actual existing **legal framework** (national, international);
- the number and distribution of birds present in Austria differ in various provinces and changes during the winter migration period;
- the attitude of people concerned differs.
- lack of **data** and data interpretation - discussion about existing fish-biomass, stocking (material, genetics, amount, size), missing statistics (angling).

It is much easier to obtain and collect bird-data than fish-related data.

Very complex interactions between many environmental factors exist, any results obtained need careful interpretation. In general, quantifying any **impact** of fish-eating animals (birds, mammals) depends on the **view of group involved** (ownership, rights, borderlines), **time periods** investigated and on the **size of the area** under investigation. For example, the anglers view is, in many cases, restricted to their own fishing ground; anglers pay for their fishing licences and therefore also expect a certain amount of fish. They fear a loss in catches and are concerned about age classes, population structure and species composition of fish.

Environment and management conditions suggest that barriers in many rivers inhibit fish migration, so fish populations cannot migrate and recover naturally. Stocking

(amount, species, quality) makes the situation even more complicated; environmental capacity, productivity of a river, habitat conditions should be taken into account

How to improve the situation solving the Cormorant-fisheries conflicts

- force interdisciplinary projects (new research methods, ecology, socio-economics)
- data about birds, fish and environment from the same locations (catchment areas)
- monitoring programs on a wider scale
- improve the quality of available fish statistics
- integration of social aspects into biological studies

Discussion:

- Ian: Costs for Cormorant management like the one in Austria can be low if no wages have to be paid (i.e. for hunters).
- Then, WG2 consulted Fig. 5.1: 'Techniques used regularly in small rivers' (p. 124, *REDCAFE Pan-European Overview* report) and worked through it:

o **Altering the timing of fish stocking:**

Daniel: A change in the timing of fish stocking only delays the problem to the next winter. Also, especially with Grayling, it is difficult to keep fish in ponds over the winter because of diseases, etc. Thus stocking of Grayling and Trout is not advisable in spring. Although in some places, certain species of fish can be stocked in spring, there are economic considerations, as fish have to be held over-winter. In France the stocking of Grayling was stopped because of genetic considerations. Also stocking is not advisable because this can result in a put-and-take fishery (i.e. a very unnatural one where stocked fish are 'put' in for paying anglers to 'take').

o **Submersed fish refuges:**

Ian: Submersed fish refuges can be efficient in regulated, medium size rivers.

o **Human harassment:**

Bruno and Rosemarie: Effectiveness depends on local situation. It is necessary to patrol the river sections regularly and continuously.
Henrik: It may be practicable in small rivers.

o **Combination of audio and visual techniques:**

Thomas: Why not effective for a longer period (given here as "days")?
Thomas: Why are costs given as medium to low?
There was a short discussion on these questions with no clear answer. But, it was generally agreed that effectiveness and costs largely depend on the individual local situation.

o **Shooting adults and immatures:**

Rosemarie: Shooting may be more effective if location is situated away from the main flyway and if done in a coordinated and concentrated effort.
Ian: The Swiss shooting strategy, i.e. no shooting at large lakes and impounded rivers (> 50 ha) vs. concentration of efforts at free-running rivers (with Grayling), and small water bodies seems to be effective.

Rosemarie: Effectiveness depends on climate, geographic location, and individual local situation.

(4) Case Study: Czech Republic, by Jaroslav Boháč and Petr Musil

Jaroslav and Petr reported on the conflicts and solutions in the Czech Republic.

(a) Ecology

Cormorants were rare in 1982 (30 breeding pairs, in S. Moravia), whereas in 2004 this had increased to 200 – 240 pairs. However, 12,000 – 14,000 birds are present during migration. Today, the Cormorant is the 2nd most common waterbird species in winter.

(b) Damage

There are no exact data on the damage caused by Cormorants. Fish farmers are granted 1 million Cz crowns (1 Euro = 30 Cz crowns) in compensation payments, although they estimated the damage to be eight times as much. Control of Cormorants is by shooting, but there are conflicts between NGOs & fishermen.

(c) Areas

The main areas of conflict are in two reserves in S. Moravia and one in S. Bohemia. Here, there is a long history of fish culture, albeit that other fish predators (e.g. sea eagles) are present.

(d) Study: Sociological aspects of the Cormorant population in pond area of Czech Republic (view of tourists and visitors, local population, fishermen), by Jaroslav Boháč, Martina Šípová, Martina Roudnická

University of South Bohemia, Faculty of Agriculture, České Budějovice.

A questionnaire was used to evaluate the human/sociological aspects of the Cormorant population, involving three distinct groups of people: the local population, tourists, and fishermen in the Třeboňsko Biosphere Reserve (fishpond area) in South Bohemia. Questions were directed about the level of knowledge of respondents about Cormorants, their view on the damage caused by Cormorants, and on management of Cormorant population (preservation or reducing the Cormorant population). About 50 persons were contacted from all studied groups this year (2005). It is a beginning of this study and material is still being evaluated. There are distinct differences in the answers being received from respondents in the three different groups. The preliminary results suggest a lack of information held by tourists and visitors, and the radical position of fishermen.

Results of questionnaire – tourists and visitors of the Třeboňsko Biosphere Reserve

- 80 % of respondents have not image or information about the conflict between Cormorants and fishermen.
- 90 % of respondents have not sees Cormorants in the wild and know it from books, journals or TV.
- 80 % of respondents think that Cormorant do not occur in Czech Republic.
- 15 % of respondents know that Cormorants cause some damages to fisheries.
- 10 % of respondents with knowledge about Cormorant damage think that it is necessary to reduce the density of Cormorant population.

Results of questionnaire – local population

- 70 % of respondents have information about the conflict between Cormorants and fishermen and they know Cormorants from nature (mainly during the winter period - migrating birds).
- approximately the same frequency of respondents think that the reduction of Cormorant population is necessary.
- 45 % of respondents think that the compensation for damage paid to fishermen is not sufficient.

Results of questionnaire – fishermen

- fishermen know very well about the conflict with Cormorant 'overpopulation'.
- 100 % of fishermen see the solution of the Cormorant overpopulation in the eradication of this bird.
- fishermen are asking for compensation for the preservation of Cormorants in Czech Republic.

Possible Solutions:

Although the study had only just begun, the likely solution will lie in the integration of biological, social & cultural issues, coupled with the positive use of the media.

Discussion:

There was debate over the extent of the damage and the number of Cormorants – anglers thought both should be larger. There was also an issue over compensation, which was only paid to fish farmers (in private ownership) and not for rivers and reservoirs (in public ownership).

- Robert: Who did the damage estimates?
- Jaroslav & Petr: The fishermen themselves.
- Robert: Fish losses are not easy to document, even in ponds. When asking fish farmers for damage they might think of quick money from the government.
- Jaroslav & Petr: Yes.
- Petr: Loss is more than 8 mio Cz crowns. We have developed a new method for damage assessment, which is reviewed by the Czech conservation agencies at the moment. It considers the following aspects:
  - Mean price of the fish eaten
  - To estimate the number of birds on the ponds is the essential problem
  - Fish farmers tend to overestimate damage; birds to be counted on more than one pond
  - 4 mio € overall damage today (in ponds and rivers)
- Ian: Is shooting permitted?
- Petr: Some 3,000 birds are shot each year.
- Bruno: Who does the shooting?
- Jaroslav & Petr: Culling by shooting is carried out by hunters on behalf of the fishermen. There is a 10 € or 1 Carp bounty for every shot bird.
- Daniel: Do you pay for expert advice?
- Petr: No, but government agencies are involved.
- Daniel: It is impossible to count Cormorants on more than 600 ponds in France. There is no compensation in France, because damage cannot be

related to the number of birds present. But, money is paid for good aquaculture practice, like water quality, including some damage.

- Thomas: What is the effectiveness of the shooting of 3,000 birds?
- Petr: Shooting is done in autumn and spring (bird migration). Birds are pushed around to other ponds. An overall reduction of damage is thus not to be expected.
- Nikolai: There is no compensation in Bulgaria. There is illegal shooting as much as possible because there is a vacuum in state regulations. Monitoring of Cormorants in ponds for compensations was stopped although data were more or less approved by the authorities.
- Ian: What is the reliability of bird counts? Fishermen tend to overestimate, but it sure is a first step.
- Robert: Shooting in migration routes leads to a lot of killed birds without any damage reduction because shot birds are quickly replaced by other ones. Thus, this is a poor solution.

Outcome: A presentation on compensation regimes will be given at the next meeting by Kareen Seiche, Petr Musil, and Michal Adamec.

(5) Case Study: Bulgaria, by Nikolay Kissiov

In 1985, Cormorants were included in the Bulgarian 'red book' as 'threatened with extinction'. Because 2,000+ of dams were built in the 1950s and fish production had increased to 20,000 tonnes/yr (60% on fish farms, 40% on dams). Consequently, since 1990, Cormorants have moved to inland areas and are now breeding there. Losses are of market-sized fish (500-800g), small growing fish, fingerlings – huge losses – and new, costly species. Today there is no more fish stocking in rivers because the government does not pay for it any more. Thus, conflicts now are only at ponds and reservoirs.

However, shooting is illegal and there is no compensation scheme. The conflict involves fish farmers, anglers, environmentalists, electricity producers and others.

(a) Study area

Cormorant conflicts were studied in a warm-water dam (Lake Ovcharitza) near the centre of Bulgaria where a coal-fired power station causes the thermal enhancement. The lake extends over 1,100 ha and experiences water temperatures of 8-10˚C in winter and 30˚C+ in summer.

The lake is rented by fishermen and stocked intensively with several species, including silver carp, grass carp and black carp, to augment the stocks of common carp, crucian carp, Wels catfish and pike. Floating net cages are also used to raise trout, channel catfish and surgeon. Because zebra mussels (*Dreissena polymorpha*) entered the reservoir – probably via Cormorants – and became so numerous that the power station had to shut temporarily (clogged intakes?), black amur were imported from Romania. Such was their rate of growth that by 2005, 5-6 year-old fish had grown to 50kg!

(b) Winter Invasion
In winter 2000-2001, during a prolonged, severe 'freeze-up' in central Europe (even the River Danube froze), the unfrozen Lake Ovcharitza was invaded by 30,000 Cormorants. They caused huge fish losses (estimated at 500 tonnes of market-size fish plus 700 tonnes of fingerlings in one month) from which the fishery has not yet recovered. Since then winters have been milder (normal) and no big Cormorant invasion has happened.

(c) Solutions?
Not easy – the birds are regarded as non-edible (no one will eat them). Hunters can help cull birds by shooting, and bird groups have rented nearby reservoirs and stocked them with low-value fish – the results are not yet clear.

Outcome: Nils will present recipes and give advice on how to cook Cormorants at the next meeting. Daniel and Ian will add information on PCBs and other pollutants in Cormorants.

(6) Case Study: Italy, by Stefano Volponi

(see also pp188-221 *REDCAFE Summary & National Overviews* report).

(a) Status
Cormorants are mostly migratory in Italy, arriving via two different flyways running (i) east and (ii) west of the Alps. Some 60,000-65,000 birds are present each year, although the birds' origins have become much more varied since the European expansion.

Originally, the birds were largely confined to Sardinia and N. Italy, mostly by the coasts. Now they are split roughly 50:50 between coastal & inland habitats. Breeding takes place in 10-12 colonies, mostly in N Italy, populated by 1,500 breeding pairs.

The increase in numbers has been 20-fold (x 20) in 20 years following spectacular breeding success in central and northern Europe, especially the 'Baltic states'. Italy hosts 15% of the over-wintering Cormorant population but only 1% of the breeding birds.

(b) Conflicts
The main areas of conflict involve:

- fish farmers
- fishermen (commercial)
- anglers (recreational)
- tackle industry

Although Cormorants are reasonably evenly distributed in Italy, most conflicts are specific to N Italy. Fishermen consider the Cormorant an alien species. Few studies of the conflicts had been undertaken.

(c) Measures
(Stefano presented a table that summarised the conflict, the fish species, the projected economic losses, the control methods and their effectiveness).

A variety of control measures have been employed, including legal shooting, scaring and compensation payments.

(d) Studies
Vallicoltura is an ancient form of aquaculture involving an embanked lagoon (for further details see below and consult http://www.cpn-srl.it/). The *valli* is flooded by the sea and the levels maintained via sluices and pumps. It is stocked artificially with brackish-water fish species, but no feeding or drugs are administered. In winter, a *valli* may hold large numbers of juvenile fish stocked in small, deeper wintering basins.

The economic impacts of Cormorant predation of fish in *valli* may be very high, the effects may last for years depending on the fish growth rate (from 2 years for Sea Bream to more than 6-8 years for Eel), secondary fish losses can occur and most Cormorant control methods cannot be employed because of the large water surface areas involved.

A wide variety of non-lethal methods were used in trial on *valli* in N Italy (N. Adriatic coast) – tapes, gas guns, scarecrows, distress calls, etc. Most merely moved the birds to adjacent ponds. When these measures were evaluated, the best were found to be physical barriers and shooting (to kill). It was also realised that to be effective, there must be a local or regional plans, using an integrated approach in each case.

Further information on vallicoltura available in:
Management of Coastal Lagoon Fisheries in Italy
Ardizzone, G.D., Cataudella, S. and R. Rossi (1988)
FAO Fisheries Technical Paper 239, Food and Agriculture Orgaanisation, Rome (Italy), pp103.

Coastal lagoons – coastal zone ***management*** *– Italy - lagoon fisheries – Mediterranean – valliculture.*

The book is a synthesis of the history of coastal lagoon management in Italy, from the traditional "valli" to the modern concrete fish barrier and integrated valliculture. It includes a directory of the Italian coastal lagoons, with their ecological characteristics and description of management methods (for both water and fisheries), and some case studies on certain lagoons from the aquaculture and fisheries point of view. There is a description of valliculture, from its historical origins to the present day. Of particular interest is the evolution of fish barriers, with descriptions of traps and chambers to capture and select different species, and changes in shape and materials, from temporary reed barriers to permanent concrete and iron gates. The historical section is important in understanding strategies now used in modern Mediterranean aquaculture, many of which have been derived from traditional valliculture practices. Many fish barriers along the Mediterranean were either built or designed by Italians according to the models developed from centuries of lagoon management in Italy. The book provides an overview of economic and administrative aspects of aquaculture in coastal lagoons, and their relationship with other economic activities concerned with lagoons, such as tourism, urban development, natural parks, and pollution.

But, there is a problem with hunting which is the most important source of income in *valli*. Thus, shooting is not attractive for the *valli* owners, or at least it is not during the hunting season (from late August – end of January). Also, eco-tourism is important for income in some *valli* and they usually are designated SPS and FFH areas.

The Po Delta area was studied in detail, and the integrated approach was employed to reduce direct and indirect impacts – worked mostly on prey availability and safe roosting sites. The intention was to reduce the carrying capacity of the habitat rather than reduce Cormorant numbers (see pp104-105, pp127-129 and pp139-141 of *REDCAFE Pan-European Overview* report).

Nets and wires were used to protect ponds, where possible, stocking regimes were amended, birds were harassed at night roosts near ponds, and birds were dissuaded from forming new roost sites (through use of lasers and bangers). On the other hand birds were left alone in the Po Delta itself. The plan also allowed some shooting reinforcement through non-lethal measures taken in fishing *valli*. It was thought that it was better to allow some shooting under controlled conditions than to accept illegal uncontrolled shooting as had occurred in the past. The whole plan was also intended to improve the attitude of local people towards the government.

Most active fish farmers realised that as the plan was working, they could begin to co-operate. However, a new management plan may be required each year, skilled people were needed to plan and co-ordinate efforts - often working during unsocial hours – and damage was difficult to assess. The management plan was also less politically 'visible' than shooting to kill.

(e) Eventually…

In the northern part of the Po Delta, the management plan co-ordinated by the local district authority (the so-called "Provincia") suddenly finished in 2001 when the regional administration decided to face fish farmers complaints in the (apparently) easiest way – that is by abandoning protection on ***all*** fish-eating birds at *valli* – thus allowing lethal measures and effectively leaving that responsibility to the fish farmers. This measure largely failed, and just one year later, a new regional hunting law came into force that allowed every hunter to shoot up to 50 cormorants per season even outside the fishing *valli*. Again, however, this political measure was unsuccessful considering that very few birds have been shot by in the three years since this radical policy came into effect in spite of a (large!) potential quota of ca. 760,000 Cormorants.

Discussion:

- Robert: Why do so many birds winter in Sardinia?
- Stefano: Because of its location in the flyway, its mild winter climate and, ultimately, its fish availability.
- Tamir: Was the management plan in the northern Po Delta in effect for one year, only?
- Stefano: It was intended for 3 years. After that, there was a law change. Now, only physical barriers and shooting (mostly after the duck hunting season) take

place. Politicians see no (more) need for a complicated management plan. There has only been compensation and shooting since 2002.

- Ian: Is there another change to be expected because shooting is not working?
- Stefano: No, there has been allowed a lot of bird shooting recently, e.g. even shooting of Chaffinches. Also, to allow shooting does not cost any government money.
- Timo: Do any *P. c. carbo* birds occur?
- Stefano: Yes, but only about 1 – 2% of the birds.
- Nils: We have recoveries of in Norway ringed *carbo* birds from that part of Europe, i.e. about two from Yugoslavia and two from Switzerland. Some birds fly all over.
- Ian: What are the views of the *valli* owners?
- Stefano: This depends on their focus, i.e. fish farming vs. hunting interests. From hunting they can make much more money. There was an attempt to change bird laws completely, by the hunting lobby. But, 95% of all Italians are against hunting!
- Timo: Are provincial laws in Italy above state laws?
- Stefano: Yes, but the EU Bird Directive is to be obeyed

(7) Case Study: Management plan for the Cormorant in Denmark 2002 – 2007, by Henrik Lykke-Sorensen

Henrik explained that he is a co-ordinator, not a scientist, although he is involved in the Danish Cormorant management plan 2002-2007.

The management plan aims to protect the Cormorant as a common breeding bird in Denmark and at the same time to prevent unacceptable damage to fisheries.

Management objectives:

1) To protect the breeding population of Cormorants as an integral part of Danish fauna
2) To help reduce conflicts between Cormorants and fisheries
3) To preserve the old colonies and other colonies in nature- and wildlife reserves

Premises for the plan

- EU Bird Directive prevents introduction of hunting, but appropriate measures to reduce conflicts are applicable
- Denmark has the Cormorant as a responsibility species
- Many Cormorants breed in reserves where breeding birds are to be protected

Management Tools

Technical measures

The plan supports modification of pound nets in order to make the catch more difficult for the Cormorant (see also pp75-91 *REDCAFE Summary & National Overviews* report).

Scaring of birds, egg oiling and removal of nests to avoid new colonies
Oiling of eggs is used as method to control unwanted population growth in certain regions. The effort is concentrated on sites where Cormorants attempt to establish new colonies on the ground on small islets: in DK about 50% of the Cormorants nest on the ground (e.g. 45% did so in 2005). In recent years the majority of eggs are oiled in large ground nesting colonies in western and northern Jutland in an attempt to reduce the number of Cormorants foraging in the fjords in West Jutland.

Interventions to prevent new colonies from being established
Eggs are oiled, nest removed and birds harassed at breeding sites to prevent new colonies from being established. Up to 10 actions per year during the last 3 years.

Interventions in existing colonies
More than 6,000 nests were oiled in 2004.

Smolt migration
Landowners/anglers can obtain a permit to shoot a limited number of Cormorants with the purpose to improve scaring in the Atlantic salmon (*Salmo salar*) smolt migrating period – at this time juvenile salmon leave freshwater and move into the sea to feed. Permits are given in river Skjern Å and three other rivers.

Pound nets
A general permit is given to all owners of standing fishing gear to shoot Cormorants within 1,000 m of standing fishing gear when it is in use (outside breeding season). Between 3,000 and 4,000 birds are shot annually.

Fish farms
General permits to shoot Cormorants within fish farms.

Discussion:

- Q: How many nests were oiled in 2005?
- Henrik: About the same number as 2004 or a little less (i.e. approx. 6,000). A problem is that the actions taken cause the establishment of more new colonies. Thus, the recreational fishermen criticise the management plan.
- Q: Is the shooting on rivers effective?
- Henrik: It seems to be working. It is done at three rivers. The anglers say it is working.
- Q: Is hunting effective?
- Henrik: There are studies on Ringkøbing Fjord, Limfjord, and Nissum Fjord where egg oiling takes place. In the latter fjord the number of birds decreased after the hunting season in one year. There is a hunting quota of 1,600 birds. But, in the years 2002/03 to 2004/05 only 200 – 250 birds were shot annually.
- Timo: Why is there a hunting quota of 1,600 birds?
  Henrik: This figure is based on certain management goals.

Figure 4: Number of nests - the grey part shows nests, were human intervention has occurred (NERI 2004).

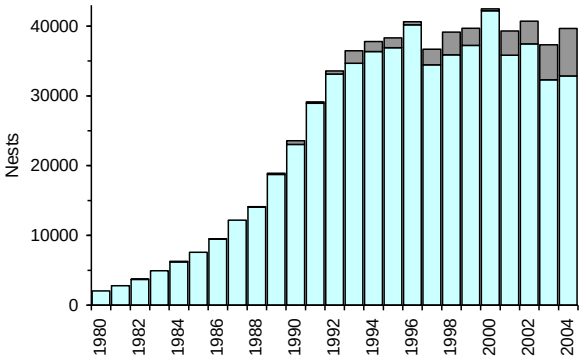
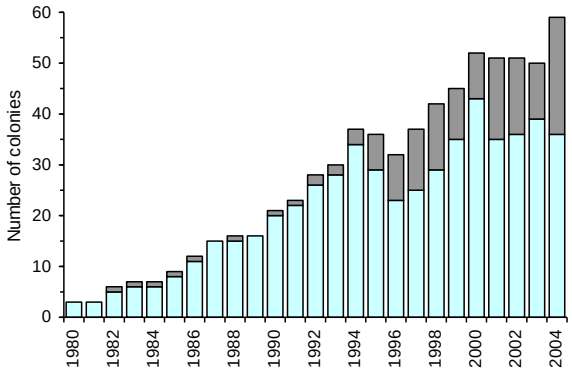


Figure 5: Number of colonies - the grey part shows colonies, were human intervention has occurred (NERI 2004).



- Daniel: We have seen that there are many management plans in many European regions. Why not have a pan-European management plan, instead?
- Timo: Even the FRAP project stopped this idea, because management plans need to be based on national legislation.
- Redik: When is shooting at fishing gear allowed?
- Henrik: From mid-April to July.
- Ian: In Great Britain shooting Cormorants on rivers during the smolt runs is not very effective because of the large areas/river sections that need to be covered. Does shooting take place more localized in Denmark?
- Henrik: Yes, we focus on that part of the rivers where freshwater meets saltwater.
- Bruno: Would you say that conflicts were reduced in Denmark?
- Henrik: Yes, they were reduced to a certain extend, i.e. anglers complain less now.
- Savas: Why does the number of breeding colonies increase?
- Henrik: Because of the disturbance due to management actions.
- Daniel: What are the costs?
- Henrik: Egg oiling costs about 100,000 Danish crowns (i.e. 20,000 €) annually.
- Timo: Who does the egg oiling? What is their education?
- Henrik: The oiling is done by forest employees. They get special training.

(8) Case Study: Norway, by Nils Røv

Nils presented a highly interesting 35mm slide show of this work monitoring Cormorant numbers in the offshore and remote islands along the Norwegian coast. Each year he surveys 15,000 - 20,000 breeding pairs (about 80 % of the Norwegian population!), mostly by aircraft surveys. The breeding success is about 3 - 5

eggs/young per nest. He pointed out that in Norway there is a tradition of eating Cormorants, and juveniles used to be culled and 'salted down' for winter consumption. Also, there was a sustainable use of Cormorant eggs, which were used for pancakes for instance.

All the birds he surveys are the *P. c. carbo* sub-species, which breed in the outer part of the coastline, not in fjords. They nest on the ground on rocky skerries using seaweed for their nests, although cliffs are also employed as nesting sites. In both cases, this means that foxes cannot prey on the birds or their offspring. The population size is limited by the carrying capacity. Birds that breed in the Finmark region in N Norway, usually winter in the Baltic.

In over 20 years of monitoring, there has been a pattern of increasing bird numbers that seems to have now levelled off. The best current national estimate is that there are 20,000 - 25,000 pairs of *carbo*, with some *sinensis* in S. Norway since 1997.

The number of Cormorants and shags shot each year is about 15,000. In Norway the birds are regarded as game species to be eaten (all 'kill to eat' not 'kill to cull'). The hunting season is now October and November, whereas it used to extend from the end of August to February following (when as may as 25,000 birds were shot annually). The birds are strictly protected outside the hunting season. This is considered a good way of management.

Post meeting information:

In Gdansk a system using 'High Pressure Water Hoses' to protect fish ponds from avian depredation was presented. A report from Germany suggested that high-pressure water hoses (controlled by photocells and triggered by motion sensors) could be a new option for smaller fish ponds. In principle, high-pressure water beams would be used as optical and mechanical barriers. In the meantime it was possible to contact the construction engineer Mr. Jürgen Kohlmorgen (Address: Gänseweg 2, D-18374 Zingst, Germany, Phone/Fax: +49-(0)38232-80655). It was learned that there is no working system, yet. Thus, Mr. Kohlmorgen is looking for a partner who would be interested in setting up a first testing system. Costs would be approx. EUR 5,000/ha plus additional costs for the motion sensors.

PART (3) Work Group Three: Linking science with policy and best practice

Drafted and compiled by Mariella Marzano, Scott Jones and Dave Carss

Participants:
Scott Jones, Mariella Marzano, Rosemarie Parz-Gollner, Miha Janc, Dave Carss, Nikolay Kissiov, Faustas Stepukonis, Susana França, Jaroslav Bohac, Ohad Hatzofe (special invitation: Israel Nature & Parks Authority), Ana Afonso Polyviou, Pekka Salmi, Volker Hilge, Erik Petersson, Vilju Lilleleht, Trude Borch, Ketil Skogen, Michael Andersen.

SESSION ONE

Introduction – Mariella Marzano
At the last meeting in Gdansk, WG3 focussed on getting a better understanding of people's leisure, livelihoods and attitudes. WG3 investigated case studies chosen at the Lisbon meeting (Danish coastal fisheries, Czech Republic carp ponds, Bulgarian Reservoir and Austrian Rivers – the last three are also the subject of WG2 explorations, see elsewhere in this meeting report) to get a better understanding of relationships, values, politics, economics and other socio-cultural aspects of species conflicts. These case studies all covered conflicts with cormorants but could be expanded out to other species to see what we can learn from them.

In Gdansk, there were four speakers each with a Q&A session, followed by several workshop sessions where WG3 attempted to identify (a) the central problems in these conflicts, (b) the stakeholders involved and (c) their interests and attitudes. WG3 still needs to consider case studies but in Saxony the emphasis was on an in-depth exploration of some aspects of the wider social, cultural and political issues that may influence conflicts.

Erik Peterson discussed a case study involving apparently **successful conflict management** at one site but **failure to transfer this** to another, to set up the first session. Pekka Salmi talked about **governance**, Faustas Stepukonis about **the role of the media** in relation to cormorant issues in Lithuania, and Ketil Skogen about aspects of **power** in relation to the 'wolf conflict' in Norway.

Work Group Three primarily undertook seven activities during the Saxony meeting and these are described below.

(1) Lake Hjälmaren, fish, the fishery and cormorants -a case study from a Swedish inland water - Erik Peterson (& Per Nyberg)

Lake Hjälmaren is the fourth largest lake in Sweden, covering an area of about 484 km^2. The mean depth is 6.05 m with an average pH of 7.5. This lake is also nutrient rich, the total phosphorous is about 50 μg/L. For a long time the lake has been

important for its inland fishery and one of the prime sources of pikeperch (*Sander lucioperca*) for the Swedish market. Other important species include are European eel (*Anguilla anguilla),* signal crayfish (*Pacifastacus leniusculus),* pike (*Esox lucius*), perch (*Perca fluviatilis),* burbot (*Lota lota*), and cyprinids. All species are caught for consumption, except cyprinids and burbot, which are mostly sold as bait for the crayfish fishery. In 2004, total catches were 239,037 kg with a monetary value of €1,106,578, and mostly comprised pikeperch. Today there are 39 licensed fishermen fishing in the lake, although few of them fish fulltime. Some family businesses operate on the lake where the fish is caught and processed (which may include filleting, smoking, boiling, packaging and selling).

The cormorant became established in the lake in 1996. There were 817 breeding pairs in 2004 with approximately 5,000 individuals gathering on the lake during August and September.

In early 1990s the catches of pikeperch stabilised at an 'all-time' low level. The catches had fluctuated in the past, but since the 1960s there had been a decreasing trend. It is important to note that this low level was reached before the cormorants were established at the lake. At the same time it has become obvious that the recruitment and growth of pikeperch is highly dependent on climatic conditions and abiotic factors. Moreover, because the pikeperch is an much-appreciated fish species on the Swedish market, it was clear that some actions had to be taken.

Some tagging experiments and lengthy discussions convinced the fishermen that new restrictions were necessary. The three most important ones were:

(1) Increase of minimum length of fish allowed to be caught, from 40 cm to 45 cm (1 June 2001)
(2) Increase of minimum mesh-size in fishing nets, from 50 mm to 60 (1 June 2001)
(3) Careful handling of caught fish.

Swedish hoop net (*picture courtesy of Erik Petersson*)

The last point (careful handling of fish) means that the fishermen pick up a few fish at a time from the pound net or the hoop net (like a very large fyke net, see picture below), select the species they want to keep (and throw the rest back into the water), measure the length of the selected fish, and throw those that are too small back into the water. The maximum time in the air for a fish before being thrown back is about 30 seconds.

Due to these new regulations, and good recruitment, the pikeperch catches have increased - despite an increasing cormorant population and a stable fishing effort.
However there are some worrying factors:

1. Despite the good conditions for recruitment in 2002 and 2003 the numbers of 3-year old fish (25-30 cm) are low, which means that the population of pikeperch of legal size will be lower then expected in a couple of years.
2. Cormorants are believed to be one of the reasons for low fish numbers. As the cormorants fish in and around the pound nets they are accused of chasing 0+ and 1+ pikeperch into the parts of the gear which have smaller mesh-sizes.
3. In the past few years cormorants have learned to search and empty the crayfish wire cages. The wire cages are usually baited with dead fish, and the cormorants tear a hole in cage and take the bait. As much as one third of these cages can be destroyed.

Due to these problems, the regional government has stated that up to 1,800 cormorants can be killed from 11 August to 31 October. The hunting has several restrictions, for example it is not allowed in certain areas, and the numbers, date and location of any birds that are shot should be reported, etc.

My thoughts are that conflict resolution is not a one-off affair, as conflict often exists all the time and has to be managed continuously. Once you reach an agreement, as in the case of Lake Hjälmaren, it is important to keep dialogue with this network of stakeholders alive - as then you have a better starting point the next time a potential conflict situation arises. Nevertheless, it might be easy to imagine that the successful results achieved in Lake Hjälmaren would inspire fishermen in other Swedish lakes to adopt the same 'package' of actions in order to improve the fishing. However, the third largest lake in Sweden, Lake Mälaren, has the same conditions as Lake Hjälmaren and would probably benefit from actions similar to those taken in Lake Hjälmaren. But the fishermen in Lake Mälaren have thus far refused to voluntarily change their fishing methods. The main argument is that the differences between the two lakes are too many e.g. Lake Hjälmaren is more homogenous whilst Lake Mälaren consists of several smaller and larger basins, which differ in many aspects. So, how do we deal with a situation where successful dialogue has led to changes in fishing practices in one lake but potential transfer of technology/management practices is rejected by fishermen in another, similar lake?

Questions, answers and discussion

(1) Do you have predation in fish traps? Do cormorants also damage fish in the nets?

EP: *Yes – and so fishermen are allowed to shoot them and take other actions.*

(2) Do fishermen say they don't have a problem now?

EP: *Fishermen say they have a problem but they are happy with the current actions such as shooting. The crayfish fisheries are a problem with a third destroyed.*
MA: It is important for the Swedish authorities to recognise that there is a problem. In relation to the conflicts in Denmark, the authorities try to belittle the problem - which is patronising – they denied there was a problem.
(3) What about poaching in the fishery?
EP: *It is not a big problem in this area but is in other areas. In the coastal area there are the five biggest lakes. It is free fishing if you use a rod and line and there is very little illegal activity. It is illegal if you use nets. In other privately owned lakes, they have more problems with poaching.*
(4) In the graphs you showed the shooting of cormorants increased but the population is still growing. Where is it going to end?
EP: *We don't know. In the South the cormorant breeding population has stabilised but in the lakes elsewhere we don't know. You are not allowed to shoot the breeding population but you kill them afterwards. So you are not reducing breeding bird numbers – you are shooting birds from elsewhere.*
OH: This is not sustainable. It takes a lot of effort and can't go on forever.
EP: *Thus far it has worked. As fishermen have increased catches of pike perch they accept the situation now but if pikeperch go down, what will happen? An extended shooting period (may as well as June, July and August)?*
(5) Are you trying to transfer the solution to the second lake, or the learning, or the method of gaining that learning?
EP: *All three*
(6) Scott- Are you trying to talk rather than impose solutions?
What are you ideas why the knowledge and the 'solution' are not being transferred from one lake to the other?
EP: *We try to focus on similarities-fishermen focus on differences. Perhaps we were happy about the solutions in Lake Hjälmaren, perhaps we had too high expectations for Lake Mälaren.*
SJ: This situation is not unusual. There are suspicion and trust issues if you try to transfer learning - its very difficult and there is a human drive to resist change.
TB: *There is cultural resistance against anything new - governance, leisure and occupation.*
(7) Do you have a different type of relationship with fishery representatives in the different lakes?
EP: *Yes, it might be. Per Nyberg has a summer cottage at Lake Hjälmaren. I don't have a summer cottage at Lake Mälaren. Is Per more accepted at the Lake Hjälmaren because his family have been there for generations?*
(8) Did you involve the Swedish Fishermen's Association?
EP: *Yes, they were involved and informed at all times – but have been very ambivalent about it.*
(9) Did they not take on board the task of transferring the technology?
EP: *They say, 'see what happens- if it works we'll see'. They are not over-enthusiastic and providing the guidelines.*
(10) VH: The mesh size was made bigger. You could apply the same measures on other lakes too – and develop a management plan. You could say (like for the whitefish fishery on Lake Constance) that people have to use trap nets of other sizes.
EP: *We can do it but it works much better if all fishermen have agreed. Only a few fishermen will do it if it is top-down- it will always be a problem.*

VH: *At Lake Constance, they increased the mesh size against fishermen's wishes but afterwards they learnt there was an increase in fish stocks – but it took years for the measures to be acceptable and for fishermen to see the benefits.*

(11) Why are there different types of nets in different seasons? Why not use a cormorant proof net all year-round?

EP: *It is very hard- Cormorants always find ways in even if there are strong nets or covers. You can have cormorant-proof nets in crayfish cages- it is a possibility but very expensive.*

MA: *In Denmark they have tried to introduce pound nets which are cormorant-proof*

(NOTE: see pp76-77 in *REDCAFE Summary & National Overviews* report

(12) Why pound nets?

MA: *Because they have been used for around 200 years ..*

VL: *Tradition*

MA: *There may be other methods but nobody has invented a new method yet*.

KS: Its an issue around accepting cormorants: Some people will not believe they should be there – some don't see the importance of cormorants or the value of having cormorants…it becomes a matter of choice.

(2) Governance and knowledge: concepts used for studying human-wildlife and environmental conflicts - Pekka Salmi

The purpose of this presentation was to support discussions in relation to potential tasks of social science research in INTERCAFE and, related to this, what kind of research activities are needed and available. Firstly, some issues concerning governance and knowledge are outlined because they are concepts relevant to the framing of themes and conflict cases (e.g. the relationships between people, animals and natural resources).

There are many definitions associated with and uses for 'governance'. For example, the European Commission uses the term in order to develop EU policy. The White Paper '*European Governance'* promotes greater openness, accountability and responsibility for all those involved. Governance can, however, also be regarded as analytic tool. Jan Kooiman (2003) calls this perspective as 'social-political' or 'interactive' governance.

Governance is a broader concept than the term 'management', which is widely used when speaking about environmental decision-making and conflicts. The governance approach takes into account the interactive social, economic and ecological systems embedded in institutions, social networks and cultures. It is important to note that here the institutions are not limited to the formal organizations (e.g. which are defined by legislation) but take into account also the diversity of voluntary organizations, informal networks as well as the daily lives of local people. 'Intentional' (i.e. governing actions) and 'structural level' (i.e. culture) governance cannot be understood without each other (Kooiman 2003: 13)

1. Intentional level of governance

Intentional level of governing interactions can be divided between:

- Images
- Instruments

- Action

Here we focus on images, which form an important element of governing interactions. Governing actors make *assumptions* about the governed and the governing world. The production and use of *knowledge* can be seen as a vast social process, where scientists, political leaders, 'ordinary' people and others play their roles. Interactive *learning* is important in image formation.

The mass media play an important, if not the most important, role in the public sphere as the major arena in which image formation is played out in modern governance.

2. The structural level of governance

The structural level shows how different actors interact in the governing process. Kooiman (2003) separates the structural level of governance into three modes:

- Self governance,
- Co-governance
- Hierarchical governance

Self governance refers to the capacity of social entities to govern themselves autonomously.
Co-governance means using organized forms of horizontal governing interactions for governing purposes: actors communicate, collaborate or co-operate without a central or dominating governing actor.
Command, control and steering are processes usually identified in *hierarchical* modes of governance.

In practice the three structural modes of governance are mixed. For instance, in environmental governance a hierarchical, top-down form is common, but there may also be a collaborative 'component' when dealing with a specific areas or issues. The co-operative and collaborative modes of governance highlight wide participation of stakeholder groups in decision making, not only in consultation.

Orders of governance

Another interesting way of looking at governance is the distinction between three orders of governance:

- First-order governance refers to the day-today activities of social-political governors in solving societal problems or creating opportunities.
- Second-order governance involves care for the operation and maintenance of governing institutions. The governance activities are aimed at the institutional settings where social-political problems are (attempted to be) solved or where opportunities are created.
- Meta governing can be translated into 'governing how to govern'. It is the forum where the normative principles for governing are formulated and tested.

The orders of governance provide one way of discussing what is and what could be emphasized in the INTERCAFE project. The material being produced in the work groups stresses improvements of practical tools (e.g. methods to protect fishing and fish farming from the damage caused by fish-eating birds) for the decision makers to mitigate the cormorant-fisheries conflicts. How much effort should be focussed on the questions of power, knowledge and values of the groups of people involved in the

cormorant conflicts? These issues are related to the institutional settings, the second-order governing.

Wolf policy as an example

The Finnish wolf conflict is an example of connecting the governance perspective to an analysis of human-wildlife conflict. In this conflict there are so many different 'images' (e.g. assumptions, knowledge) offered that one cannot imagine that there could ever be one collective definitive view or image of the situation that everybody would be happy about (Ratamäki 2004). Therefore the question should not be what the leading image is (e.g. who is right?), but rather how to deal with the different views. Ratamäki stresses that there should be more focus on the institutional level in order to handle the conflict.

Moving towards co-governance is an opportunity but it is not a universal or easy solution. Discussions and learning during the collaboration may not radically change the different images of the groups, but there are options for increasing the understanding and trust between the opposing groups and reaching solutions which everyone can live with.

Knowledge

One can discuss how much an increase in knowledge ('facts') would contribute to the success of governance and how much effort should be put towards building stronger institutional arrangements, which support communication between stakeholder groups with different types of knowledge.

There are many types of knowledge, such as scientific, expert, lay person, traditional (ecological), local (ecological), practical, indigenous and fishers' knowledge. For instance, Kooiman (2003, 104) provides a (rather instrumental) view of co-management and the use of fishers' knowledge: *"Co-management suits governing situations where in governing interplays the inclusion of knowledge of users (images) leads to more legitimate measures (instruments) and raising the compliance to these measures (action)".* In general, the question is not only about the outcome (the decisions) but also about the process e.g. do the stakeholder groups consider that their knowledge and values have been used and appreciated

Scientific knowledge plays a special role in environmental debates, but lay people often mistrust scientific knowledge. This is linked to their critical attitudes towards the motives, interests and values of outside actors. In a case studied by Peuhkuri (2004) the producers and users of scientific research are seen as representing urban recreational interests, ecological fundamentalism and an alienated connection to nature. The environmental administration and environmentalists stress the importance of technical and biological knowledge while Peuhkuri's study shows that the main sources of conflicts are in the areas of interests, values, communication, mutual trust between different groups, and cultural factors.

Examples of literature

European Commission 2001. European Governance. A White Paper.
Kooiman, J. 2003. Governing as Governance. SAGE Publications. 249 p.
Kooiman, J. van Vliet, M. & Jentoft, S. (eds.) 1999. Creative Governance. Opportunities for Fisheries in Europe. Ashgate, pp. 259-272.

Kooiman, J., Bavinck, M., Jentoft, S. & Pullin, R. (eds.) 2005. Fish for Life: Interactive Governace for Fisheries. MARE Publication Series Volume III. Amsterdam University Press.
Ratamäki, O. 2004. Governance and Finnish wolf policy. Paper for an interdisciplinary PhD course ”Environmental Governance and the Promotion of Sustainable Development” at the Umeå University, Sweden.
Peuhkuri, T. 2004. Roles of Knowledge in Environmental Conflict. Debate and Decision Making Concerning Eutrophication and Fish Farming Industry in the Archipelago sea Region, in Southwest Finland. Turun yliopiston julkaisuja – Annales universitatis turkuensis, sarja C osa 220. University of Turku. In Finnish with English abstract.
Tonder, M.2005. Anatomy of an Environmental Conflict – A Case of the Conservation of the Saimaa Ringed Seal. University of Joensuu Publications in Social Sciences nr 75.

Questions, answers and discussion

(1) What is the relationship between governance and government? The latter sounds more cosy and inclusive, but what's the difference?

PS: *Governance = Action. Governance is more broadly related to actions and institutions, including the non-governmental organisations. I see government as a narrower concept related to the state-level.*

KS: *Governance seems to be a movement from top-down to participative forms of governing. My impression is that the word "governance" is quite widely used today to denote a more participative form of government. But there is very little evidence that new administrative arrangements are really more democratic or that they lead to empowerment of social groups that have limited access to traditional power structures. There is good reason to ask whether current decentralisation of power is not really a form of neo-liberal privatisation – the state pulls out and leaves crucial issues to local 'markets'.*

KS: *Local people prefer fish-farming and see environmental regulations as urban interferences. For people in cities, food comes out of the freezer.*

FS: People are suspicious of scientists. Usually scientists give recommendations but lay-people wonder why they gave the recommendations and are suspicious of them.

TB: *Education is also an issue. Local stakeholders use scientific arguments. They interpret science to suit their own benefits.*

KS: Don't we all?

EP: *It is important to have governance. For example, there are five projects in Sweden were the Swedish Board of Fisheries is trying out methods for fishery management, one could call the method 'local governance', 'local management', 'co-management' or something like that. The idea is that a group of people, representing different stakeholders should manage the fishery in a certain area. And all should be running under the supervision of the Board. When the Board invited stakeholders to the first meeting they got surprised; people that manage the land and land use close to the fishing areas regarded themselves as stakeholders.*

MA: There is growing frustration in fishing societies – co-management is just a buzzword. It is a battlefield where you fire arguments but you are going to be governed anyway. [Fishermen] should be given some responsibility too. Everyone uses this buzzword but if they don't have responsibility what is the point of participating. Scientific knowledge is often used to document that the government is right. From an end user's viewpoint, maybe there is too much science and it hinders conflict resolution.

SESSION TWO
After presentations from Erik on issues facing two Swedish lakes, and Pekka on governance, WG3 produced a summary:

(3) Summary: governance and transferring knowledge

Governance – could be thought of as the 'rules of the game' – encompassing rights, roles and responsibilities[1].
Links with 'management styles':

- self-managing teams
- co-management (including partnerships?)
- bureaucratic hierarchies
- collegiate systems

"Taking care" of institutions involves being inclusive and respectful, for example with regard to different people's knowledge and ways of doing things.
This leads to increased legitimacy of the measures that people take in response to conflict (e.g. solutions) and people's compliance with things like "commitment packages" that may be negotiated or agreed by some means.

Subgroup work
The group then split into four sub-groups to consider:

What works well and less well extending 'solutions' from one place to another, even though the context looks similar.

Discussion points raised from this group work included:

(1) The role of an intermediary, who may arise either by chance or who may be searched for. This person may have different names, depending on their role and other factors (see Table 4 below).

Possible intermediary names/roles	Issues to consider for deciding role(s) for intermediaries
▪ Mediator ▪ Facilitator ▪ Broker ▪ Moderator ▪ Arbiter	▪ ***Language*** - ability to understand and translate the way different groups use language ▪ ***Neutrality*** - some roles require neutrality, e.g. mediator; others do not necessarily, e.g. broker ▪ ***Voluntary process*** – sometimes an intermediary is engaged through a legal process, but perhaps more usually it is a voluntary role ▪ ***Legitimacy*** – someone who is acceptable to all sides because of their special role, knowledge, skill or authority

(2) It is necessary to agree the "frame" of the problem at each of three 'stages'. (a) defining the problem; (b) the cause of the problem (e.g. overfishing? Cormorants?); (c) what measures should be taken to 'solve' the problem. Related to this are some

[1] See previous section on governance by Pekka Salmi: governance is not really about one set of clear rules that are agreed and followed by everybody, it is really more about how everybody's different sets of rules are combined and played out in practice.

key concepts such as trust, acceptance, legitimacy, patience and the need to take the right amount of time, humility, preparation, going step by step and working with the local people and seeing it from a different point of view ("contextualising").

(3) It is not possible to 'transfer' unless the recipient of that transfer wants to receive. Maybe we should not worry about transferring learning from Lake 'H' to Lake 'M'- just suggest that these 'solutions' are available
Ownership of solutions can occur over time; Lake 'M' may decline solutions in first instance but accept them later, or re-invent them as their own.

(4) What is the role of the scientist? Perhaps do not tell the people what to do, but advise what will happen if they went for option x or option y. There are good example of collaboration between scientists and local fishermen. For example in Denmark, fishermen planned a common survey with scientists and worked with them – as a result, the Sole quota has doubled. Coming to the table and giving the impression you know you are right is not going to work.

(5) Seal case study shows that scientists had misconceptions over fishermen's needs. Here, projects were done by fishermen in co-operation with fisheries scientists in order to develop seal-proof fishing gears (nets and traps). In some cases, the scientists did not rely on the local knowledge of commercial fishermen during the development process of new gear. Thus, the fishermen's interpretation was that the scientists had not engaged in developing gear that caught fish efficiently and benefited their fisheries and that scientists concentrated more on gaining scientific merit.

(6) White-tailed Eagle case study, scientists provided independent facts – seen by local people as a very positive (and necessary) move when conflict between sheep farmers (who claimed eagles killed their lambs) and conservation NGO (who said lamb predation was not an issue) had polarised the conflict.

(7) People may see the institution embodied in an individual.

(8) The need for more trust – face-to-face contact is important. Israel example of authorities sending a woman to present plans to stakeholders – this improved the situation! This was thus an example of when even the gender of some of those involved can affect the outcome of some site-specific conflict management issues.

(9) People are not always rational – situations may not be predictable – do not rely on 'rational' responses.

(10) Two more generations of Erik/Per living in the area around Lake 'M' may encourage more trust!

(11) The time issue is very important: people's time frames are different. For example, conservationists may want fish stocks improved now, Governments may have a 3-year agenda (to fit with the election cycle), fishermen may have a 10-year perspective. Thus the time frames – and the costs – are very different for different groups. When these time frames clash: "sitting on the stove with someone else's arse."

SESSION 3

(4) The Role of the Media in Forming Attitudes towards Cormorants - Faustas Stepukonis

This presentation discussed the role of the national media in representing and influencing attitudes around human-cormorant issue. The following points were highlighted:

Background:
1. Mass media (TV, newspapers, radio) is a primary source of information for ordinary people. It can influence society's opinions on cormorant/fishery/forestry conflicts.

2. The media can more or less influence the decision-making process in political spheres.

3. The media more or less correctly reflects positions related to cormorants of local people, specialists, stakeholders, politicians. However, the mis-representation of science (which, unfortunately, happens quite often in the mass media) can ferment ungrounded worries in the society.

4. The media can give more or less reliable information, the details of which, in some cases, can be useful for INTERCAFE.

5. Media representations can demonstrate the level of national understanding in relation to a local or European conflict.

6. The media can be used by INTERCAFE to disseminate science to lay people and policy-makers.

The role of the media in Lithuania
There is a lot of attention from the mass media in Lithuania on 'nature problems'. The biggest Lithuanian media sources like *Lietuvos Rytas* (the biggest daily newspaper in Lithuania) or *Lietuvos Nacionalinis Radijas ir Televizija* (National Lithuanian Radio and Television) do present fairly reliable information in relation to cormorants in Lithuania and across Europe. However, smaller and more 'local' media sources like *Klaipeda* and *Vakaru Ekspresas* (local daily papers for Klaipeda district in Lithuania) tend to sensationalise news, often mis-representing scientific findings concerning cormorants. Comments by readers (via the internet and editorial pages) have demonstrated that there is widespread interest in the cormorant issue with readers expressing negative opinions about the species, whilst others describe people as the biggest enemy of nature. INTERCAFE can learn about public opinion from reading mass media sources- while some readers may exaggerate and mis-represent science, local knowledge of the environment can also found.

For example, one reader (commenting via the internet on an article sensationally entitled "*Occupation of Curonian Spit by Cormorants Taking Place*" appearing in the national daily newspaper *Lietuvos Zinios* [20.04.05) does give their professional

comment on the mis-representation of science in article, thus demonstrating that false information sometimes cannot go through.

However, most commentators show relatively modest understanding about the problems related to cormorants. Discussion about cormorants with those familiar to me (e.g. holiday makers near cormorant colonies in Lithuania, commercial fishermen, anglers, family friends) show that most people have heard "something" (mostly negative information) about cormorants from the media (TV, radio, newspapers), but would not recognize a cormorant if they saw one directly. Interestingly, those people who watch the cormorant colony in a specially arranged viewing place for tourists at Juodkrante, have a very bad impression about cormorants.

Publications

A number of media publications were discussed in the presentation:

1. Cormorants make horror in Juodkrante again
   Klaipeda (local daily newspaper, 25 March 2005);
2. Occupation of Curonian Spit by cormorants is taking place
   Lietuvos zinios (national daily newspaper, 20 April 2005;
3. Concerning cormorant number regulation in Lithuania
   Internet (Bird Life, 5 May 2005);
4. Shoots at Sea coast are raring population of cormorants
   Lietuvos rytas (biggest national daily newspaper, 6 June 2005);
5. Two ministries have "hatched" cormorants
   Internet (Delfi, 6 June 2005);
6. Salvation from cormorants – only with the help of Europe (publication distributed)
   Vakaru ekspresas (local daily newspaper, 2 August 2005;
7. The war against cormorants is declared (publication distributed)
   Lietuvos rytas (biggest national daily newspaper, 8 August 2005);
8. Wetlands: water, fishermen, human
   Internet (11 September 2005).

Questions, answers and discussion

RPG**:** *Everybody involved in INTERCAFE are getting phone calls and questions on INTERCAFE. Affects the quality of information- popular and fastest media format is the internet but there is no control. So, I have retreated from the internet-there is so much garbage, there is no time to check. Nobody is controlling the quality of information-how can we deal with this issue? When we put stuff on the internet ourselves, we need to take care of the quality.*

TB: Everyone knows how the media works. We should have a media strategy, to have materials ready for the group. Trude then discussed her own research where she has made a partnership with journalists to promote tourism.

NK: *In Bulgaria the cold winter meant that cormorants came to south Bulgaria. This was a good time for the media but after there was nothing about the cormorant conflict. Is it our responsibility to show the work being done* by INTERCAFE *to the public using the media- especially as we expecting another cold winter. Maybe we should have press release with text and photo's.*

MA: Would this be to change public opinion? You would expect journalists to be impartial but nobody is-it's human nature: working on the path of changing opinions - that is my job as a lobbyist.

DC: Science is as objective as you can make it.
MJ: *There are very many quarrels in the media. There is a lot of playing around with data- it is stretched or squeezed according to interests and who delivers the message. It is helpful for local people to have some data which, by definition is objective (hard data).*
MM**:** In what format should this data be presented?
RPG: *There is no single answer. You have to adapt according to the needs of the people you are involved with.*
MM**:** This will take time.
RPG: *It takes time and to ensure the quality of the data also takes longer.*
OH: We have a lot of experience working with the media. For example:
(1) On controversial issues, never do a recorded interview and they will edit according to their interests
(2) With Problematic issues e.g. culling, go to the media before doing the action. If you have a plan, then inform the media as a first step
(3) Advise the reporter to interview your opponent. It gives you more credibility.
MA: *It is important that you are in control of the press strategy and do not react to silly questions*
TB: It is important to find a good journalists network. Journalists have particular deadlines
KS: *Conflicts are exaggerated in the world media. It is good to disseminate and educate the public but the people involved in the conflicts are the least influenced by the media. We don't believe in sources we don't trust. People who have strong opinions don't feel they need information from scientists. The media will only have a significant effect on groups that are the least important in conflict issues. A media strategy is important but we have to recognise that we would have a hard time reaching people who are heavily involved.*
PS: That is a good point- fishermen get their knowledge from their own networks. When they read newspapers they may read fishermen's newspapers. Are we going to make any media studies e.g. survey of newspapers in other countries?
MA: *Newspapers are not the most obvious way of communicating to the public. You can break it down to individual points and make a story. I would find it difficult to make a snappy story about INTERCAFE.*

DC**:** I am scared of talking to the media because the mass media want snappy, punchy headlines. We should explore how the media is used in other countries, not just newspapers but magazines from different target groups.
EP: *A colleague of mine that worked for six months for a local government, being responsible for the fishery management in a region in Sweden (around Stockholm), told me that he had another freedom in that position: he could say things without having any scientific evidence that supported his view. When working for one of the research laboratories of Swedish Board of Fisheries that is not possible.*

OH: We should invite reporters to INTERCAFE to discuss this issue.
EP: *I know a seal fishery scientist- he uses the internet and looks up newspaper on the internet and what has been written for the previous 6 months. He is then informed and can give informed answers when questioned.*

Summary of Discussion: A Media Strategy for INTERCAFE?

- What messages do we need to send out?
- Who do we send these messages to?
- What formats should dissemination take (paper, interviews, electronic, TV, radio, press releases, meetings, workshops, one-to-one)?
- Planned vs. unplanned
- Refer to Dave and Mariella if in doubt

Some key points:

- Produce short, ready materials that people can draw upon
- Build and maintain a network of journalists who you trust and know who you cannot
- Plans and strategies – use the media in a conscious way
- Whose responsibility is it to respond to media problems and opportunities – especially when we don't all know everyone's situation or language? Should there be a country-based 'representative?'
- Make it attractive
- Scientists should be objective - discuss
- Who are the people you NEED to reach – choose your format/content accordingly
- Know where your target group gets its information from
- Respond effectively to cross-national needs and differences
- Be as concise and to the point as possible
- Clear messaging – reduce the possibilities for ambiguity
- Use visualisations to break up text and make the thing attractive – not words only
- Make sure data are current, but not holding back when good data are available even though the 'purist' would like the very best data which will take three more months to get
- Take care with recording – these can be edited in bad or controversial ways
- Be credible – invite journalist to solicit different views and direct her/him to those other sources
- Don't just be reactive – have a strategy
- Remember journalists have deadlines
- Take control of the message
- Get media overview and needs overview for each country

(5) The Role of Power in Human-Wildlife Conflicts – Ketil Skogen

Social science and human-wildlife conflicts

Social science which focuses on human-wildlife conflicts has often centred on power-relations between the human actors involved. Social scientists tend to highlight the perspective of the underdogs in most social relations. In this case, that generally means seeing agents of conservation as powerful and various other stakeholders as having less power. Although this could be seen as a message from my own research on the conflicts over large carnivores, the picture is more complicated. The case study example I will use focuses on wolf conflicts in South-Eastern Norway

Anti-wolf attitudes predominantly prevail among people who are firmly rooted in traditional land use practices and in a rural working-class culture. They are not always

– or even predominantly – related to adverse material effects of wolf presence. In our study areas, the most impressive concentration of such sentiments was found among local hunters with a strong place attachment and a working-class background. They saw hunting as a crucial element in the local culture and wolf protection as part of the cultural expansion of the urban middle class, and of a larger pattern of unpleasant things that happen to rural communities. These processes were seen as originating within in powerful elites in cities, with no regard to the wellbeing of rural people. To the hunters, the wolf was not a symbol of wilderness, but an urban icon.

Underlying the hunters' views was also a sense of being subject to patronizing attitudes. From their point of view, the dominant discourse on carnivore protection was a typical middle-class effort to shape and correct the opinions, attitudes and practices of working-class people. Thus, the struggle against wolves and carnivore protection could be seen as a form of *cultural resistance*. Cultural resistance means contestation of the worldview of the powerful - of a "hegemonic paradigm".
It is not necessarily (or deliberately) launched as a struggle for power, but as a struggle for *autonomy*.

Who are seen as having power; as a "ruling class"?
What the environmental movement with its firm middle-class basis has in common with many government agencies, is that it aggressively seeks to interfere with people's values, beliefs and lifestyles. While capital and the market execute tremendous power over people's lives, the mechanisms are generally hidden from view and apparently perceived as less offensive even when they are visible.
There is considerable cultural commonality between the working class and the *bourgeoisie*: the defense of material production – and associated values – against the cultural expansion of the modern middle class, entailing, among other undesirable things, extensive nature protection based on a romantic view of nature.

The new middle class may be seen as the culprit behind the mass of regulations interfering with every conceivable aspect of human existence, not least private enterprise, and here elements of working-class and "bourgeois" culture tend to converge. This has – sadly – brought about a cultural alliance that unites its forces in a struggle against what is construed as the modern power elite – that is, basically against us.

There are three forms of cultural resistance in the "wolf field":

- The social construction of a threatened community
- The struggle over knowledge hegemony
- Demonic rumors

The symbolic construction of 'community'
There were three main groups of wolf adversaries in our study area: The hunters, sheep farmers and land owners. 'Community' is a flexible symbol that all three groups (and others) can use to focus on a common external enemy – despite diverse material interests and historical class conflict The rural community is constructed as an idyll in grave danger, where the quality of life is threatened by "society at large" (and its wolves).

Contested knowledge

Rival knowledge systems play an important part in shaping the carnivore conflicts such as scientific knowledge and lay knowledge based on local observations and experience. There is a hierarchical relationship between the knowledge systems but they are equal in the sense that their supporters are equally skeptical towards the other form of knowledge.

Which type of knowledge people identify with seems to be closely related to their position on the wolf issue, at least in our study areas. Groups that identify strongly with practical lay knowledge may see it as an element in the defense against undesirable social change, and against an annoying cultural and political dominance. There is nothing particularly "rural" about this - it is a basic feature of traditional working-class culture. Nevertheless, we found that big landowners with university education also felt that their "local knowledge" was ignored, while at the same time actively communicating that they were modern, educated people. The same applied to some sheep farmers. In this area, some of the most vocal among them are people with a non-local background who have sought the "good country life".

Demonic rumors

One crucial issue in the wolf controversy is the question of how the wolves got there in the first place. Many people firmly believe that they were secretly reintroduced either by the authorities or by environmentalists. The stories that support this notion have all the characteristics of so-called "demonic rumors". These are stories about malevolent intentions on the part of large corporations or the state, most commonly aimed at hurting various disadvantaged groups. They connect power to agency by introducing purpose and planning, thus making sense of an otherwise vaguely felt association between strenuous social conditions and the omnipresent, yet unapproachable, economic conglomerates or state apparatuses.

In rural areas, the state exerts power in ways that are seen by many as incomprehensible and arbitrary, or – worse – as part of a strategy to depopulate rural areas. Central characteristics of rumors are similar to the way in which the presence of these conglomerates and the state is felt in people's lives. Thus, demonic rumors could be seen as a way of turning the weapons of the state and the corporations against them.

Points for discussion

- How do we relate to (political) issues outside the field of resource management?
- Should we think more about building alliances and less about "governance"?
- Is consensus among all "stakeholders" a goal?

Questions, answers and discussion

DC**:** Rumours: when Thomas K and I were in Boston at a double-crested cormorant meeting we heard stories from the southern States, where local fishermen were saying that they believed that cormorants had been introduced into the USA by the Japanese as revenge for dropping Atomic bombs there during WWII.

MA: There are rumours in Denmark that ornithologists are sneaking in cormorant eggs. People feel alienated, they see themselves as victims and they demonise the problem which indicates that they feel in a corner. Nobody listens to them.
EP: In Sweden there is a rumour that eggs from Denmark are smuggled into heron's nests. It is a conspiracy theory (demonic rumours) and it is very hard to meet them with logic.
Building alliances is probably the best way as it doesn't matter how much governance you have- the problem is already there.
MA: *If you say it is not a problem, they say it is a conspiracy.*
TB: Power changes with place, time and date. Demonic rumours are a big problem- if these rumours persist, then particular groups 'have power'. It is real for groups that feel like this. This is the frame they have- we have to try and change this frame through the media.
KS: Scientists are a little less cocksure when dealing with rumours. They cannot demonstrate that rumours are false. For example, genetic studies show that the Scandinavian wolf population was once extinct and that the present stock came from Finland. That's a long walk around the Bothnian Bay to the southern part of the peninsular where they now live, and many people ask why the passed the northern wilderness. Scientists insist that it has been a natural migration, but concede now that some human interference cannot be ruled out entirely. Only a few years ago they claimed with certainty that the present wolf population was the "original" Scandinavian one that had recovered.
MA: *How do you discuss this with the stakeholders. It is important to find out if the rumour is to do with the government or private individuals and detach yourself from the 'criminals' that did it.*
PS**:** Hunters and scientists have a long collaboration but do scientists have a long collaboration with other stakeholders
KS – *Yes. For example in the tracking of large carnivores there is organised collaboration with regional and local hunters and anglers associations, scientists and the state.*
The initiative originally came from hunters and anglers
They thought the shooting quota is too low so they wanted to co-operate. The lynx quotas disappeared. The hunters and anglers took the initiative, they saw it as their project and they ran with funding. It had a good impact which helped lower the conflict in that region concerning lynx.

WG3 then spilt up into subgroups to address the 'points for discussion' presented by Ketil. In fact, there was only time to deal with one and each sub-group chose the same one:

(6) Is consensus among all stakeholders the goal?

Define consensus:

- *Voting* has winners and losers – the majority 'wins.'
- *Unanimity* is where everyone agrees
- *Consensus* is where people can live with what is suggested. For example, we may not all agree that working in subgroups is heavenly, but we all can 'live with it' because to not do so would stop us making progress. We do not then

have to have consensus on every single issue the small group discusses. We reached consensus about the process, but not always about the content.

The task could be divided into two parts – (a) to decide whether consensus is the goal and (b) who are "all" stakeholders – who decides who "all" the stakeholders are?

Possible stages:

1. list stakeholders
2. undertake analysis (many possibilities, but for example review needs and fears)
3. Review and agree issues around legitimacy and who has the right to represent each stakeholder group
4. Leave an open door, but perhaps it isn't necessary or desirable to have all stakeholders at the table all the time. It would be good to ensure that formal invitations are made – but respect people's right to decline but still keep them informed. Make sure the problem people, if you like, are at the table –do not exclude them, but manage them over time.

We reflected on the value of certain powerful tools that can capture levels of participation (e.g. informing people, or consulting with them, partnering with them, or leading a group) and consider these in relation to the life of a project or an intervention – from design through to evaluation.

We explored words like compromise but didn't all agree on what the word meant.

We discussed the needs for capacity building within INTERCAFE, e.g. to understand media issues or to develop our understanding of conflict management principles and tools.

Other points included:

- What should be the role of politicians?
- Should we allow ourselves in a Conflict Management process to be free from the constraints of existing rules?
- Entering a conflict (choosing to get involved) can lead to new conflicts (see for example: Warner, M. & Jones, P.S. [1998] Assessing the Need to Manage Conflict in Community-based Natural Resources Projects. Overseas Development Institute, Natural Resource Perspectives, No. 35, July 1998, http://www.odi.org.uk/nrp/35.html).
- What should be the role of science – advisory or just indicating options and consequences? It often is not easy to retain objectivity and not be political.
- Language – is the word conflict management more useful than conflict resolution? Many thought so, some weren't so sure.
- Someone mentioned that the boundary/border between science and politics is an illusion.

(7) Israel meeting – January 2006 - Preparations

People expressed an interest in:

- Having presentations that reflected different groups being done as far as possible by people from those groups, or as close as possible to those groups. However, there are issues around translation, confidence, logistics and other things that may not make this easy.
- Being able to have each group's own version about events and the process through time – people's own stories about the process from their point of view
- Learning about cultural links with fish production and conflict management issues elsewhere in the INTERCAFE program area
- Gaining insights into governance and management structures – ideas about participation and how these things have changed over time – real and perceived !!
- Knowing what INTERCAFE can contribute
- Understanding potential opportunities and problems for the future (e.g. Tamir mentioned 'hibernating conflicts') – how the situation is being monitored and managed.
- Needing inputs from WG2 and WG1 into WG3

PART (4) Report on field trip, including Q&A session with local stakeholders

Background to Field Trip Report

INTERCAFE held its third meeting in Bautzen, Saxony 30th September to 4th October 2005. A one-day field study was undertaken in Upper Lusatia on 1st October. The purpose was to understand more about the way local stakeholders framed issues around cormorant-fisheries conflicts, and the problems and opportunities resulting from these.

Map 1. Upper Lusatia in Saxony, Germany

The group was briefed by local carp pond aquaculture experts and German scientists who knew the area. We then visited:

- An annual harvest festival celebrating carp and carp production
- A carp pond aquaculture business
- Old open-cast mining
- Biosphere Reserve "Upper Lusation heath and pond landscape"
- Water reservoir and Quitzdorf Special Protected Area (SPA)

On the field trip we were joined by local business people and carp pond experts, a colleague from Biosphere Reserve Administration, local scientists and ornithologists.

INTERCAFE participants divided into three working groups. Each group wrote a short report from the study visit. These were brought together for this case study which reports on:

- A brief background to the area
- Discussions at a Harvest Festival and with staff from Kreba Fisch GmbH
- Biosphere Reserve "Upper Lusation heath and pond landscape"
- An analysis of the water system and predators
- Landscape effects and predation levels

- Potential changes in the carp pond area, and
- A STEEP analysis of some of the issues emerging

Brief background to the area

- Unemployment; East-Germany 19 %, Saxony > 20 %.
- Upper Lusatia is about 950 km^2 with about 150 000 inhabitants, decreasing by 1000-2000 annually. It is important to create possibilities for education of young and older people.
- The area is a mix of German and East Slavian peoples - Sorbs are a significant minority group.
- Carp production is a 500 year tradition and a good example of positive, sustainable human-nature interaction.
- About 500 people are full time occupied with fish-related or fish ponds work. An important cultural and social landscape would be lost if the fish ponds were lost.
- Cormorant impacts on fisheries were described as big issues that can not be solved on a local level but on a European level. Compensation covers a maximum of 80% of total fish losses, but the amount depends on the budget (e.g. in 2004, compensation payments covered about 44% of estimated losses).
- It may be a possibility to use surplus hot water from electricity plants to enhance fish production in some localities.
- Falling prices are a serious issue - competition from other countries. Germany imports 5,000 tons of carp from Czech Republic. In addition the German market is declining - changes in food habits/trends among young Germans; older people still eat carp, younger people tend not to.

Harvest festival and Kreba Fisch GmbH

INTERCAFE participants attended the first netting and harvest of carp from Piezschang - an 8.6 hectare pond, ca.1.5 meters deep, belonging to Kreba Fisch GmbH (www.kreba-fisch.de). Harvesting is done in autumn.

The small-scale festival included a 6-piece brass band, speeches and announcements from local officials and business people, and had a large marquee with seating. Local produce and art work was sold with many stalls selling carp and other fish products. Several stalls had marketing and publicity material available and people were on hand to explain what was happening for visitors.

- Upper Lusatia is the centre of carp production in Saxony and holds a large concentration of fish ponds. Carp production is an important part of local culture and history; the oldest maps show fish ponds from the 15th century.

- The system is also considered important for biodiversity. Collaboration with organisations for nature conservation is considered an important issue for the company. They support contracts with conservation organisations. A compromise that should lead to the sustainability of the activity and assurance that this continues to be a dignified way of living for the local community. They do not wish to live from subsidies.

- The Festival marks the opening of the fish harvest season; this area is the centre of the production and in Königswartha there is the only school in the area for training for fish farming. The Festival is an important marketing activity (in combination with angling and tourism) to promote a regional product (no export market). It helps to anchor the culture and economic base in the minds of local people and visitors.

- The company Kreba – Fiswch GmbH succeeded the state company that was privatised after German unification. It started in 1992 and local fishermen were given the right to fish. The company produces mainly Lusatian Mirror Carp but also grows pike, catfish, tench and sturgeon as well as ornamental coloured fish. The company's fish farm also produces fry, some of which is sold to other companies. Fish are grain-fed 2-3 times a week.

- Grain feed consumption is ca. 3,000 tons a year. Feed grain is bought from a local company, it is not produced by the farmers themselves.

- Cormorants are a problem - an average number of 1,000 rises to 4,000 in August to September. The balance between fish farming and cormorants is a difficult issue. "*This issue is never free of conflicts*" the company owner stated. Compensation is paid and companies can get permission to remove nests and eggs by flushing out nests with high-pressure water sprays.

- Farmed fish is € 1.73 per kilo with actual prices to consumers around € 4.50 per kilo. The fish farmers have no influence on the trade, something a senior company manager describes as "*unfortunate*."

- There is cooperation in marketing and sales through a wholesaler among 5 companies that have ~250 ponds covering 1,700 hectares. About 5% of annual turnover comes from angling licenses, which is low but helps with cash flow. Each license is €15 per angler per day, with a bag limit of 2 carp and 2 trout or other species.

- About 5 % of sales are direct with the remainder of sales for the 5 companies organised by Kreba Fisch, which holds 500 hectares of the total area. The 5 companies produce 800-900 tons of carp and 120 tons of other species, and 700-800 tons of fingerlings (the total carp market in Germany is 15 000 tons).

- Fish are transported in tanks with water, 100 kg per tank and a maximum of one hour transportation.

Biosphere Reserve "Upper Lusation heath and pond landscape", open cast mining and reservoir creation

Former open-cast coal mines in Lusatia are being converted into artificial lakes, largely by ceasing to drain water from the mines and by pumping water from the River Spree system. Of 20 mines in the area, two are still operating. The former mine that INTERCAFE visited will be the largest lake in Saxony; in two more years it will

have reached full capacity. Fish migrate from the river Spree into the lake as river water is also being used to fill the lake.

While no islands will be left at this lake, another artificial lake 10 km away has an island of about 100 hectares, which provides a potential breeding territory for cormorants and other birds. It would cost €10 million to flood the island. The lake is frozen for only about 3-4 weeks each year.

The lakes have become highly acid as the mines fill with ground water. River water mixing with the lake will reduce this acidity. However, river water is not freely available and the amounts that can be abstracted are controlled by a regional environmental authority.

Negotiations between Saxony and Brandenburg regarding water usage depend on expert advice to politicians. INTERCAFE was advised that there is no community involvement in this political and expert-led process because there are no effects on community. However, there is perhaps scope for the involvement of ordinary people or representatives of resident and visitor groups.

The Biosphere Reserve aims to create a stakeholders' network to promote different activities, including tourism. During summer weekends the Reserve receives between 200-300 visitors a day in the area INTERCAFE visited. Most tourism is day visits. The Reserve has 200-300 beds in hotels, 200 beds in private homes and 1000 camping spaces. Anglers, ecotourists and other tourists presumably have a stake in the area as well as the commercial and agricultural sectors and water regulators.

A few kilometres from this lake is a reservoir (Talsperre Quitzdorf) created with two others as part of an area plan between 1965 and 1972. The reservoir was created by a dam placed on a tributary of the River Spree on a flood plane only ~3m deep. Its main function was to supply water for industry but also for aquaculture and to provide flood protection. The reservoir is also used for recreation, angling and nature conservation. The water is now being taken from the lake to keep the level of the river Spree high.

Because the gradient is low there are plenty of wetland areas suitable for birds when water levels fall. Birds are protected; we were told that since 1972 no ducks have been shot in the area. Although the lake is artificial its margins are irregular and provide diverse habitat. Trees have not been removed and marshy areas have been created. Kreba Fisch rented part of the reservoir but it proved unsuitable as a commercial fishery. One side of the reservoir is used for recreational fishing.

Cormorants use the reservoir during migration and roosting. Recently seven cormorants tried to establish nests but the nests were destroyed. Because the cormorants also stay to feed in the reservoir there are no conflicts with surrounding fish farmers, we were told.

Forty five fish companies are in the Reserve area each with about 3-4 employees. Initially, with no artificial feeding, production was reported as 50 kg per hectare. With feeding, fish production rose to 200-300 kg per hectare. During the communist period with its financial difficulties, importing sea fish was impossible for economic reasons and the associated government policy not to import sea fish. As a result, incentives for intensifying local fish production reached 3,000 - 5,000 kg per hectare. This led to negative environmental consequences around the same time as cormorant populations started to increase. Recently a much lower production of ponds in the Biosphere area is compensated for financially. Some 300 kg per hectare is considered the compromise level between economic production and preserving some of the water-related biological values, although this varies among the three different categories of ponds.

There is a fish ladder in the Reserve and about 300-400 river otters. This was reportedly "*not a problem to the fish farmers. The cormorants make a much better enemy*." For otters, there is the possibility of obtaining financial help if they are damaging to fisheries.

Management measures for cormorants in the Reserve include:

- Nest destruction (only possible if a nest does not have eggs and after negotiation with the Reserve management)
- Scaring (which could be done by shooting some birds – up to 250, although about 600 cormorants were shot each year in Saxony). Scaring is not allowed when other protected bird species, for example eagles, are nesting.
- Pyrotechnics and noise machines have been attempted but seem ineffective as the birds adapt to them.

Compensation is another measure for managing conflicts with cormorants, an approach that creates a positive climate for negotiations with fishermen.

An analysis of the water system and predators

One Working Group linked data in the scientific literature with data obtained through consultation with local stakeholders and personal observations. They used the field study to establish a field-based, quick report of the local situation and used existing expertise and judgement of participants in their Working Group to estimate the system parameters. One group member then brought this analysis together. Their edited report is given below.

Fishponds

First, the technical structure of the water system was established. General data were gathered about surface areas, number of predators, diet and economic performance of the fisheries. The area considered consists of intensively managed fishponds. The Cormorants are migratory, exploiting the water bodies from ~5 main roosts.

The ponds' characteristics can be summarised as follows:

- the areas are semi-natural looking, surrounded by trees and bush growth, resulting in a semi-closed landscape
- sparsely inhabited and large forest areas surround the water bodies
- water for the fishponds is retained from impounded river sections
- smaller or wider stretches of reed, bulrush or other macrophytes are bordering the small lakes in some places
- the water tables are maintained artificially; at the time of harvest the system falls dry and fish is being collected in the deepest part of the basin

In the course of time production has increased considerably (Table 1).

Table 1 Historical facts and figures of the Saxony case

- 1700 ha of fish ponds in the core area (ca 250 ponds), total area 2100 ha - yield in fish pond area: 50-100kg/ha period 1700-1900 (average yield) - yield in fish pond area:100-200 kg/ha 1900-1940 (additional feeding) - yield in fish pond area: 4,000-5,000 kg/ha maximum aim GDR 1960-1990 (fertilization/additional feeding with high protein pellets). More usual production was 1 – 1.5t/ha. - yield in fish pond area: 500-800 kg/ha (1,000 ka/ha) 1990-2005 common practice - yield in fish pond area: 300 kg/ha "sustainable yield" with ecological values respected

Ponds range in size from several ha up to over 100 ha each. Larger water bodies include reservoirs, river sections and recently developed new water bodies resulting from restoration activities in former open cast coal mining. Table 2 lists the surface areas of water bodies in the region: re-flooded, open cast mining areas and fishponds form the most important groups.

The total production of Carp in the area is ~ 900 tons, for which annually some 3,000 tons of wheat are supplied as food for the fish. Besides harvestable Carp (the 3 year old group), per annum another 800 tons of fry (0+ group) and young 1+ group fish are being produced. Other, more recently introduced species include Catfish, Grass carp and Silver Carp, but Carp *Cyprinus carpio* remains the main species.

Table 2. Surface area of water bodies according to water habitat type in the area

Water body type	**Surface (ha)**
Special protected area (SPA reservoir)	700
Open cast mining	2,000
Fish ponds	2,114
Others (small bodies)	1,300
total	*6,114*

Cormorants

Data about predation by Cormorants are available only in general terms. The number of birds is highest between July and October (Figure 1). No significant breeding occurs as yet.

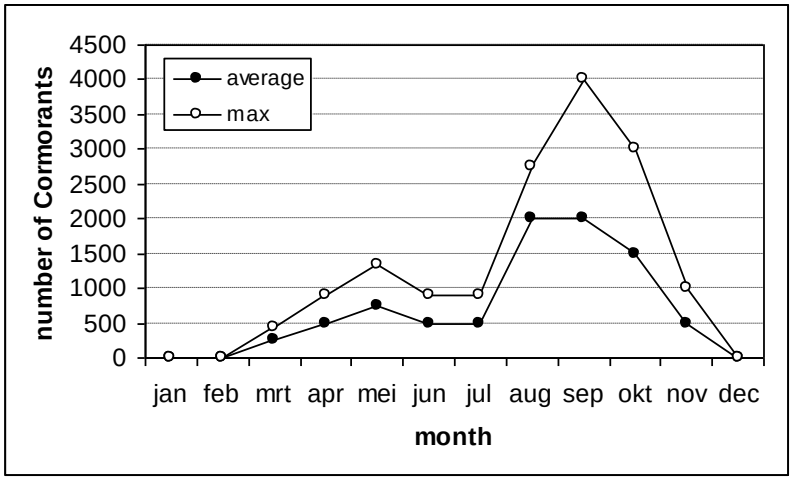


Figure 1. *Monthly changes in Cormorants numbers present in the Biosphere Reserve area.*

Predation was estimated on an almost semi-qualitative basis to provide a general, broad-brush context to the biological picture in the case study area. The starting point used general data about average fish consumption per Cormorant per day (400 g). This was multiplied by the number of Cormorant days per month, in order to arrive at annual consumption. The total amount of fish in the area was again very broadly estimated for three groups of water bodies:

- Carp ponds (including information from farmers)
- reservoirs and
- "non-managed" water bodies including recently formed lakes in former coal mine areas (based on local information from Kareen Seiche).

This simple calculation suggests a range (based on maximum and minimum bird numbers, variations in dietary assessments, and amount of 'available' ice-free foraging habitat in winter.) of 100-170 tons per annum of fish taken by cormorants, of which some 50-130 tons may comprise of Carp. This is the biomass that may be consumed by cormorants but ant indirect damage because of wounded fish is unknown.

Figure 2 shows the estimated production and successive predation by fish-eating birds including cormorants in the region of the Biosphere Reserve. Carp are mainly found in the fishpond area. Other fish species show a greater abundance in other waters but

do occur on carp ponds as well (based on local knowledge provided by Kareen Seiche).

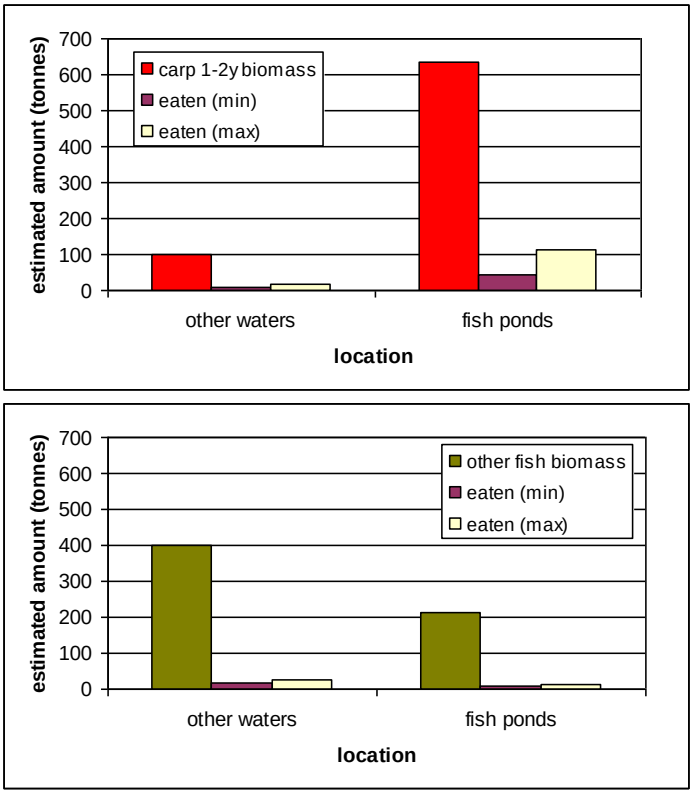


Figure 2. *Occurrence (tons) of Carp and other fish species in fishpond area and in other water bodies, together with the estimated amount of consumed fish by Cormorants and other predators. Predation levels are presented as minimum and maximum estimates. Year 1-2 Carp are specified here as they are the most commonly consumed sizes taken by cormorants.*

Predators other than Cormorant

Other predators include a variety of avian and mammal species, which are all inhabitants of the Biosphere reserve. Some 150 White-tailed Eagles (15 nests), 400 otters, herons, egrets and gulls take their share. We roughly calculated total fish consumption by these groups in order to compare it with that by the Cormorant. From Fig. 3 it seems that Cormorants might contribute around 60% of the roughly estimated fish predation by wild animals in the area. It is therefore important to take these other losses into account when focussing on the Cormorant problem in order to put the latter into context.

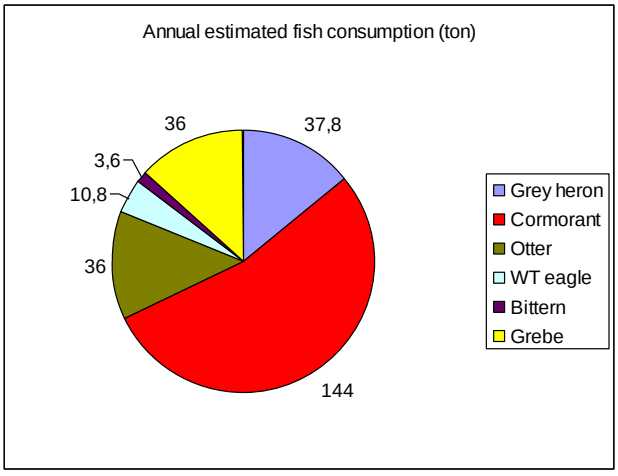


Figure 3. *Estimated amount of fish consumed by all fish predators in the region of the Biosphere Reserve area.*

Landscape effects and predation levels

Availability of water bodies for Cormorants is related to:

- the geographic location of the water bodies
- position of roost sites,
- and the accessibility of the waters for foraging birds (water transparency, level of disturbance, fish size and density, distance to nearest roost).

Figure 4 shows that roosts occur at regular distances from each other, well spaced out across the entire area. Average distance between night roosts is 9-12 km, this being the ecologically optimal distance for Cormorants to exploit the area. The fishpond system is thus easily within reach from the roosts and birds can change position according to local preferences or changes in food supply.

Another observation is that the presence of open large-scale water bodies in impounded stretches of river, reservoirs and the new lakes in former coal mine areas adds significantly to the picture of extensive occurrence of inland wetland habitat. The ponds thus are surrounded by additional water bodies, which attract avian (and other) predators. Any disturbance in the pond area can easily be overcome because of available "refuge" habitat.

The increase of feeding and roosting site availability by restoring the landscape from former mining activities is therefore very likely to have contributed to the increased levels of predation pressure on individual ponds.

Potential changes in the carp pond area: judging the future by looking at the past
What will be the future of the carp pond area and is there a likely chance in reducing the conflict with fish-eating birds? For this we have discussed the future developments and we will suggest a set of possible solutions to the perceived problems. Discussions with local stakeholders contributed to this view.

System related changes
The system's "use" has developed over time. Though less intensive than during GDR times, production of Carp is still intensive, with local problems with water quality, including algae, disappearance of macrophytes, low oxygen content, increased turbidity.

The preservation of the area has meant recognition of its natural values, but might also have attracted more fish-eating wildlife to the area. Habitat restoration has added to this picture (e.g. as a result of legislative changes after reunification) and resulted in larger populations of fish-eaters becoming established. The future situation will continue to attract larger populations of Cormorants, related to the strong increase of the species along the coastal areas of the Baltic States, in Sweden and locally in some states in Germany as well (Mecklenburg-Vorpommern). Therefore there is no reason to believe in any change towards lower predation levels in the near future.

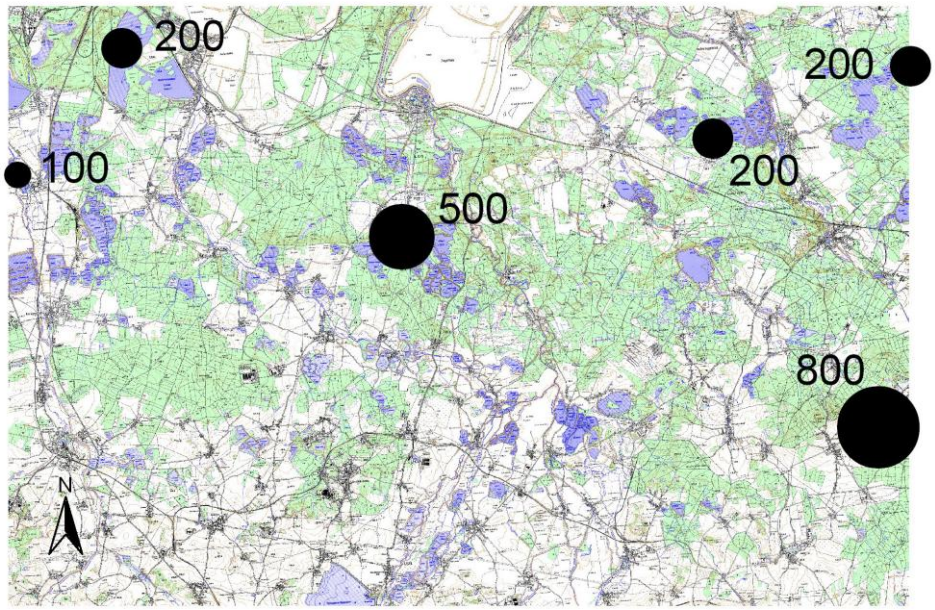


Figure 4. *Bioshere Reserve and adjacent territories (Biospharen Oberlausitzer Heide-ind teichlandschaft) showing fish ponds, natural water bodies and recently flooded lakes in former coal mine areas. Roost location and maximum estimated size (number of birds) are indicated. Some roosts are situated just outside the borders of the Reserve.*

Market-related changes

Fish production is likely to decrease as costs further increase and market prices continue to fall. Conflicts related to cormorants' fish predation therefore will continue, and quite possibly will tend to increase.

Compensation schemes presently exist that allow fish farmers to become financially compensated for the losses. Payments vary annually but have been in the range 600-800,000 euro. Overall this system involves some € 600,000 paid as compensation per annum throughout the region. The estimated losses of Carp due to Cormorant predation are thus reasonably well compensated, as the price per kg amounts to € 5.25. The marketable price of 3+ Carp is about € 1.79. Thus, compensation takes into account the future value of predated Carp of 1+ and 2+ cohorts as it is based on market prices (it is therefore dependent on the age of the carp: C1 in autumn = 3.83 euro/kg, C1 in spring = 4.60 euro/kg, C2 in autumn = 2.56 kg/ha, C2 in spring = 3.07 euro/kg, C3 in autumn = 1.79 euro/kg.

The Saxony case is useful and interesting, allowing constructive analysis in an area where large changes have occurred. Besides changes in the political system, the socio-economic position of fish farmers is under pressure as well.

European legislation and local protection of a species that has expanded widely in the Eastern part of its breeding range has caused an increase in the number of predators.

The landscape restoration activities have greatly added to this situation and will continue to do so in the near future.

The questions point to cormorants as the major problem, but the economic story of a decrease in the Carp market became evident during the discussions. Other species, the position of neighbouring wetlands and the global patterns of Cormorant distribution contribute significantly to the local picture.

Concerted management activities are not carried out yet and were considered impossible, for example directing cormorants to the reservoir. In fact, zoning the most valuable (productive) Carp areas where disturbance prevails (no roosts allowed, bird scaring) separately from more naturally managed areas where wildlife could be enhanced would seem a likely option to explore. Nature tourism could partly take over the economic disadvantage of a reduced production of Carp. Producing alternative fish species takes time and is only a valid future direction from the market side of the problem.

STEEP Analysis

A STEEP analysis provides information covering **S**ocial, **T**echnological, **E**conomic, **E**cological and **P**olitical aspects of a situation. One work group carried out a STEEP analysis of the observations made and information collected during the field visits.

Although it was not possible to complete this, the analysis provides a useful tool for taking dialogue forward. It would be possible for different groups to add to this analysis or to use it to further summarise more of the issues that have been raised above.

Social (and Economic)

1. The population in this part of Germany is declining by about 2,000 people each year. Carp production in Saxony represents 25% of the total annual production of carp in Germany. However, Saxony is the largest carp pond area in Germany and fishermen here rely completely on fish farming for their economic existence.

2. There are changes in dietary preferences – younger people are less keen on eating carp than their parents.

3. Competition is under-cutting the price of carp – fish can be imported (e.g. from the Czech Republic and Poland) and sold at prices cheaper than those sustainable for German carp.

4. Unemployment is high, especially among young people, and the fish farming consortium is a significant employer (400 jobs in the area, 500 in Saxony in total).

5. The preparation of carp bought ‘in the round’ (whole fish, gutted or otherwise) presents problems as modern kitchens are small and many consumers prefer to purchase ‘kitchen-ready’ foods.

6. Demand for carp (for food) is quite seasonal – most notably for Christmas consumption. Although supermarket outlets prefer products to be available throughout each year and all fish companies have fish storage facilities and can sell carp throughout the year, the main issues seems to be one of seasonal market demands.

7. In the form that it is currently sold, carp (for food) is an 'old' product aimed at a traditional, declining market. It would be sensible to look for new markets using a more 'modern' product.

Technical

1. Although the annual harvesting of carp takes place in autumn and winter, attempts to store the fish (live) for sale during other seasons have not been particularly successful – the fish can deteriorate in condition.

2. Harvesting appears to be a complete event at each pond (the whole carp population is removed at once) – to meet changed markets, different sampling methods may be required (e.g. traps) to allow repeated, small-scale harvesting of fish.

3. Predation of fish by cormorants represents an important but not over-riding impediment to the carp-rearing business. The carp production cycle is spread over three years. 3rd year carp are too large to be consumed by cormorants, and 2nd year carp probably become too large mid-way through the growing season. Efforts to deter or prevent cormorant predation therefore need to be focused on 1st year fish and the initial phase of 2nd year growth.

4. This may be assisted by amending the growing regime to grow 1st and 2nd year carp in ponds where protection from cormorants could be maximised – smaller ponds of more uniform nature will be easier to protect than large, irregular-shaped ponds (which could be reserved for 3rd year production).

5. During the site visits there were few outward signs of measures to deter or prevent cormorant predation other than the acoustic device at the ponds where angling was also taking place. No anti-predation nets or overhead wires were seen at any of the fish-rearing ponds. Most ponds are considered to be too big for the effective use of such techniques.

Economic (in addition to points mentioned elsewhere)

1. The total value of the carp harvest of 3,000 tonnes per annum @ 1.79 euros/kg wholesale price is 537 million euros. Production and harvesting costs were not disclosed by fishermen as this information is commercially confidential.

2. Very rough calculations suggest that cormorant predation losses and compensation payments for consumed Carp are of a similar order of magnitude. It also appears as though compensation payments make some

allowance for the discrepancy between the value of juvenile Carp taken by the birds and their eventual market value had they survived to market value.

3. The compensation payments of 600-800,000 euros probably represent the difference between a commercially viable carp-rearing business and one that would otherwise fail. However, the continuation of this financial support is not assured, and the business could collapse were compensation reduced or withdrawn.

Environmental

1. The fish-rearing ponds have historic importance and joint use (fish production and nature/landscape conservation). Were it not for the compensation payments, these uses would probably generate considerable conflict.

2. In the historic fish ponds there are conflicting issues regarding stock densities: fish farmers wish to maximise production by rearing fish in large densities whereas lower stock densities are preferable from a nature conservation standpoint.

3. Sometimes the water quality in some of the ponds is poor, leading to algal blooms, low nocturnal oxygen concentrations and fish deaths (the likely cause of the mortalities observed in some of the biosphere ponds).

Policy (the group's discussion was incomplete)

1. There are land use issues relating to the use of the historic fish ponds for carp rearing. For example, if compensation payments are withdrawn and the carp-rearing business fails, who will pay for the upkeep of the ponds? Conversely, if the economic imperative is to increase carp production and fish stock densities, how will this be reconciled with conflicting nature conservation issues?

2. It is not clear whether or not there are other planning constraints which impede efficient carp production. For example, is it acceptable to stretch overhead wires across ponds in the biosphere? Can new, more regimented (and more easily protected) ponds be constructed? Ate there other pond sites locally which are more suited to carp rearing and would permission be given for their use?

3. The possibility of compensation payments in the future is unclear, but it is likely to be dictated by policy decisions (and politics). This means that its continuation cannot be assured.

Evening Q&A session with key stakeholders

(1) I don't get the impression from the field trip and our discussions that Cormorants are a big enough problem to put people out of business. Do you see a future for this kind of carp farming business, how could it develop?

A: *The Cormorant problem is great but it doesn't stop fish production. It is not too strong a problem because of the compensation scheme. But if compensation declines, it becomes a big problem. We will try to enhance production in some parts of Upper Lusatia through a warm water aquaculture system.*

(2) It seems as if each actor receives around 100 euro in compensation, this could be a very low figure. Are you happy with it?

A: *Saxony currently is unique in Germany in paying compensation. We are not necessarily happy with it but it is all that is available at the moment.*

A: *50-60% of the loss to cormorants is covered by the compensation – but there is also lots of extra work involved in scaring the birds away form farms, we have four people doing this!*

A: *We don't allow Cormorants to breed here. We get permits to spray water to flush down nests or eggs before they hatch.*

(3) Are Cormorants the biggest issue for you?

A: *Not the number one problem, for example new fish diseases are a big problem for us.*

(4) We saw other fish species being farmed as well as the carp. Is there a possibility to diversify?

A: *It is hard to farm the other species and there is no market for them.*

(5) We saw a lot of new reservoirs in the area, some are not used as fisheries. Could you use them as alternative foraging sites for Cormorants that are scared off fish farm ponds? I understand that tradition is important, but traditions change and we have to be realistic.

A: *No chance!! The distances are very short. Carp ponds are immediately adjacent to these lakes.*

Response – then you need a coordinated scaring scheme.

A: *We tried [offering Cormorants] high densities of different species of fish but we could not keep the birds at these sites.*

(6) What are the five most important difficulties in your fishery business today?

A: *Cormorants. Fish disease, Marketing/fish production. Other predators (otters and herons that often work with cormorants). Bureaucracy /legal aspects/regulations. Ownership of the ponds – often the ponds are leased from the state and there are quarrels about new contracts. Difficulties in buying our equipment from the state – we need our production to pay for these things.*

(7) How much co-ordination is there between farms? Have you explored other markets – your carp sells for 1.5 euro per kilogram, as live carp in the UK they would be worth 13 euro.

A: *All carp fishermen are in some form of association – but they all grow and sell carp so they are competitors too!*

(8) This is a comment on the situation rather than a question. We have seen an extremely beautifual and old landscape that has been taken care of for a very long time. The fishermen are not just fishing, they are taking care of the landscape – I would like to come back and see more of it. Everyone wants to maintain these landscapes – but it is not an easy job. But 'solutions' must be found to maintain this.

Session ended with a two-way discussion on why there has been an increase in cormorant numbers and a move to inland fisheries – a topic considered important in relation to predicting the future development of the problem. Main comments were:

- there has been a big expansion fo fish ponds with lots of fish in them across Europe – Cormorants can easily exploit them

- Cormorants are generalist predators and opportunistic too. People may think of the population reaching 'saturation' but if this is at too high a level it is because of human activities.

- the stock of Cormorants is large and as it increaes, it spreads – it is a simple spill-over effect.

PART (5) Carp pond sub-group meeting summary

Drafted and compiled by Tamir Strod and Kareen Seiche

The INTERCAFE carp pond sub-group sub-group met (4-5 October 2005) with stakeholders for an additional workshop immediately after the official INTERCAFE Saxony meeting. Stakeholders generously funded this extra workshop.

Participants: Kareen Seiche (Germany), Daniel Gerdeaux (France), Robert Gwiadza (Poland), Tamir Strod (Israel).

Local Participants:
Ulrike Weniger (Saxon Ministry of Environment, responsible for fishery affairs),
Dr. M. Gruschwitz (Saxon Ministry of Environment, responsible for nature protection),
Dr. G. Füllner (Fishery administration),
Dr. G. Bräuer (Office for Fish Health in Saxony),
R. Broddack (Angler association in Saxony),
W. Hänsel (Angler association in Saxony),
U. Popella (Angler association in Saxony),
Dr. W. Stiehler (President of Fishery Association in Saxony).

(1) The meeting was held on behalf of the advisory board for local fisheries and took place in Königswartha. INTERCAFE participants met some regional representatives, presenting the situation in France, Poland, Czech Republic and Israel to them. Some relevant comparisons and possible applications were discussed.

(2) All participants undertook a field excursion during which the system of growing fish, cormorant problems and cormorant management suggestions were discussed.

(3) Two different fishpond companies were visited and a full overview of the growing cycle and management techniques in carp ponds was provided. At the second company, fish harvesting activities were demonstrated. In addition, the group visited a trout farm in a lake (a former old open cast mining area), where carp and trout are grown in cages in the lake (and some other lakes in the area) created from abandoned coal mines and partly also used for tourism.

(4) The total fishpond area in Saxony is approximately 8,400ha, with standard depth of about 1m. The annual production is around 5,050 tons of fish (0.6t/ha), 3,000 tons is carp. The rest are various species – tench (*Tinca tinca*), roach (*Rutilus rutilus*), pike (*Esox lucius*), pikeperch (*Sander lucioperca*), catfish (*Ictalurus punctatus*), stickleback (*Gasterosteus aculeatus*) and grass carp (*Ctenopharyngodon idella*). The growing cycle, aims for market-size carp (1.2-1.5 kg), and takes about 3 years.

There are relatively few permanent workers in the fishpond industry, most workers for the fish harvesting are temporary workers. On average, each fishery company is allowed to kill up to 50 cormorants/year (it is thought that in some regions more than 50 birds are killed per farm, and in other regions fewer are killed), and receives around 20,000euro/year to compensate for "losses due to cormorants." At least one of the companies has asked for an increase in these figures. However, financial

compensation is not guaranteed forever and its complete cancellation might be considered. All fishermen are unsatisfied with the economical status of the carp ponds in the area.

(5) The mean daily number of cormorants in Upper Lusatia is between ca. 500 individuals during the breeding season and a maximum of 3,000 during the autumn. Taking in account some over-estimation (i.e. calculations were "*very generous*" to avoid to avoid criticism from fishermen), the annual predation by cormorants is assessed to be about 200-250 tons, or 4-5% of the annual fish yield.

(6) Conclusions and recommendations for further management

(6.1) The actual fishermen–cormorant conflict is **stable and moderate**. This situation is based primarily on the generous compensation for "losses due to cormorants", which, to some extent, is an inherently political tool.

(6.2) In this case, it is better not to change anything and **to keep the present balance**.

(6.3) However, **if the balance were to change** in the future with the anticipated cancellation of compensation, action toward cormorants should be considered. **The Hula-Valley model** is then recommended (3-year program), under necessary modifications regarding the local conditions of fish growing techniques, employment and nature conservation demands. Alternative feeding lakes: one is available and another will be available within a few years. These alternative sites are in the vicinity of the fishponds.

(6.4) Overall, the general impression is that growing carp with current techniques, and under the current market conditions, is very difficult from an economic point of view. **The cormorant is only one problem facing the fishpond companies.**

PART (6) Interdisciplinarity – progress report

By Scott Jones (ecologist and social anthropologist who works as a facilitator, researcher and trainer in conflict management. Scott assists with facilitation and programme support for INTERCAFE).

Background

Because of my role as a neutral facilitator, I have been asked by the INTERCAFE Action Chair to reflect upon INTERCAFE's activities and progress to date. This report draws together these reflections under the headings:

- (1) Action Objectives (including links between INTERCAFE activities and overall goal)
- (2) Action Management
  - 2.1 overall
  - 2.2 work groups
  - 2.3 meetings
  - 2.4 field trips
- (3) Conclusions

(1) Action Objectives

The Action's goal is targeted toward policy development. It has proved helpful to summarise activities and intermediate objectives in a hierarchy (as in a logical framework) to help frame the way in which these contribute to the goal. In Table 1, Work Group (WG) **Activities** deliver **Outputs** that contribute to INTERCAFE's **Purpose**. Achieving this Purpose would in turn contribute to the **Goal** of the INTERCAFE Action.

Table 1: Indicative Hierarchy of Objectives for INTERCAFE (objectives taken from the Technical Annex).

The vertical logic described in Table 1 was a response to two early needs identified by the Action's proposers (Dave C and Mariella M):

1. *A sense of progression and purpose in WG activities*. The outputs from WGs are not ends in themselves but part of a growing and linked contribution toward the Outputs that INTERCAFE will deliver. These outputs in turn contribute to the Purpose (strategy development), which informs the policy development Goal of the programme.

2. *Interdisciplinarity; working between WGs as well as within them toward joint problem solving*. Interdisciplinarity is regarded by the coordinators as **(a)** a key approach to the work, helping to re-frame the sector-based thinking that limits cormorant-fisheries management solutions developed by single disciplines, and **(b)** fundamental to achieving 'output' and 'purpose' level objectives directly (Table 1). Thus, coordinators have seen inter-disciplinary work as both a process and an outcome that directly impacts on INTERCAFE's objectives.

A key strength of the programme to date has been this dual focus on progression - steady, measurable progress toward outcome-focussed objectives, and the inter-disciplinary focus through which this is being achieved. Participants themselves are now actively seeking the cross-WG working that was not easy to achieve at the beginning of the Action.

There is strong evidence within the programme that objectives remain valid and achievable, and that progress toward achieving them is being made at an appropriate pace. There are high levels of energy in WGs and participants are strongly focussed on achieving WG (activity-level) objectives; these remain internally coherent within each WG and participants agree with the logic of them.

At the Saxony meeting (1-4 October, 2005), a short review was undertaken with each of the WG coordinators, concerning their degree of comfort with the pace of their work and the likelihood of achieving WG objectives on time. All WG coordinators were able to provide a time frame for their group's work and felt that the pace was manageable and the activities relevant.

Not all participants have a strategic view that INTERCAFE will contribute to policy development. While some participants seem to appreciate the long-term, policy and strategy focus of the Action, others seem more to appreciate the networking with like-minded scientists who can relate to their particular field work and research programme.

This more parochial focus with some people is understandable in an Action with so many participants. However, the net contribution of individuals is effectively managed and coordinated toward achieving programme objectives. Importantly, almost all participants are making significant contributions that each add value not only to other individual's work but also to the Action as a whole.

(2) Action Management
INTERCAFE involves a large number of people from many countries. Management tasks seem to fall into four main categories:

- overall programme management
- managing WGs
- management of meetings, and
- the management of field trips

Participants' self-management is good; everyone seems to be strongly focussed on delivering work they have agreed to take on. That said it has proved not always easy for all participants to deliver reports, data summaries and the like on time - a concern for programme and WG coordinators and also for the participants themselves. It is understandably tough for people to do their regular jobs and additional tasks for INTERCAFE. This calls for particular management skills for the programme as a whole.

2.1 Overall Action Management
Communications between the coordination team and participants are frequent, relevant and engaging. Reports and updates are informative, letting people know what is happening and what is expected of them for future work. Information about logistics (e.g. workshop travel, accommodation and finance), workshop activities and options for future work all are communicated openly and in a friendly, accessible way.

Coordination between WGs and between Management Committee, Steering Committee and *ad-hoc* groups of people seems to be good. The coordinators take trouble to be as inclusive and open as possible, and have an overall approach to management and communications that seems to be much appreciated by participants.

Discussions early in the programme highlighted three main areas for concern for coordinators in addition to the 'normal' concerns that an Action of this size merits;

1. inter-group working and progression toward overall programme objectives - the ability of individuals and WGs to keep their eye on 'the big picture' and see INTERCAFE as a whole rather than as separate satellites of activity
2. individual participants' sense of achievement and comfort with the process - that the programme was working as a whole but also for the individuals involved
3. value for local stakeholders and the linkages between field trips and programme objectives - especially Output Two (Table 1).

The early focus on people and process, rather than simply being task focussed, seems to have paid dividends as the Action has proceeded. Participants feel valued and respected as people as well as for their expertise, and the process is understandable and relevant.

In my view, the main reasons for the early programme success that is emerging are;

- the energy and motivation of individual participants,
- effective coordination and management of the overall Action and of cross-group work which is
  - practical
  - strategically focussed on objectives, and
  - takes time to monitor quality and ask quality-related questions of the data that are being generated
- a positive, friendly and empowering attitude among the management and coordination team.

The Saxony meeting also provided good evidence for increasingly successful management within WGs.

(2.2) Managing Work Groups

All six of the WG coordinators have strong inter-personal skills. They are respected for these as well as their professional expertise. They have different styles and levels of experience, though, with regard to workshop-style facilitation for working groups. These groups are also quite large and consist of experts who are leaders in their own countries.

Although many of the participants are known to each other the early difficulty for everyone was developing a facilitation style that was relevant for each WG, at the same time as each WG was working out its role and responsibilities. Although some concerns were expressed that this was not an easy thing to achieve, individuals and WG coordinators have made been considerable efforts to get the process right while still focussing on WG outputs.

It has proved helpful to separate the formal structure of the WGs from the informal structure. Formally, the WG coordinators must manage and coordinate their groups in such a way as to help them deliver WG outputs. However, this does not mean that each coordinator must also facilitate every single event, or work only on the WG's process. In fact it would be unhelpful to do so because the WG coordinators are themselves experts whose contributions need to be included in the WG activities. This point has been made with individual coordinators and with the group as a whole, so that WG coordinators can use the skills of the group to call upon others to facilitate or run sessions. This releases them, for that period of time, from having to manage the group's process while also trying to contribute to the content - something that even the most experienced facilitators try to avoid.

The second way in which WGs are managing the balance between "facilitating the process" and "contributing to the product" has been to work with multiple 'informally recognised' facilitators. In some WGs during meetings, the facilitation changes among a small group of participants, allowing everyone to make contributions while also being comfortable that ideas are being developed, recorded and reported back to the whole group.

In sum, WGs have developed a relaxed but focussed management style that differs among groups but had become by the Saxony meeting successful at delivering outputs to tight time schedules during the meeting.

However, while it has quite quickly proved possible to work successfully during meetings times, it is proving more challenging to maintain the momentum after the meetings. This remains a hard nut to crack because:

- everyone is busy and has to concentrate on their main (paid) job
- field work takes many participants away from the office for long periods
- the motivation and pressure to deliver that can be developed in a meeting simply cannot be maintained once people have gone their separate ways

This dilemma is of course sensitive because participants give up their weekends to come to meetings, and, being leaders in their field, many people are calling for their time. Still, it is necessary to help participants get the balance right between what they commit to delivering and the timescales over which it can be delivered. It is important, though, that this responsibility is shared among the Steering Committee members and indeed all participants.

(2.3) Meeting Management

The management of meetings falls into three stages and involves different combinations of people at each stage - preparation, delivery and follow-up.

Preparation for workshops involves considerable effort and coordination on logistics, most of which falls to the Action's proposers and the host country leaders. Content and aspirations for each workshop are guided by the programme documentation and initial proposal but also by participants themselves in collaboration with the steering committee and programme coordinator. Preparations related to meeting processes are undertaken mainly by the coordinators with some support from the external facilitator. The INTERCAFE team is experienced and competent at meeting organisation and all the meetings have been very well prepared.

Meeting delivery is managed overall by the coordination team with small changes in the agenda or process agreed between the Chair, Steering Committee, and external facilitator through frequent informal meetings. Individual WGs are managed by the WG coordinators but with informal facilitation from others as described above. Meeting delivery has been sound and quite high degrees of flexibility have been achieved to take advantage of opportunities.

Follow-up after meetings tends to be a shared responsibility among the participants (especially WG leaders) who committed to certain activities (such as report writing, spreadsheet data collation, communications with local stakeholders) and the coordination team. In practice, as with most programmes, it is not easy for everyone to deliver on time the quality of product to which they committed. Because participants prize quality and accuracy so highly, the slippage almost always is expressed as a time delay. As in many meetings, people over-commit or else meet a busier desk on returning to the office than they anticipated. A lot of the burden for ensuring follow-up actually takes place falls inevitably on the coordinators.

(2.4) Management of Field Trips

Designing and delivering a successful field trip to meet Action objectives and the needs of 50+ participants is a challenging task. But as REDCAFE showed, the rewards can be high for everyone, including the local stakeholders.

For INTERCAFE coordinators, the most important aspect of any field trip is to secure a worthwhile case study that advances the Action's objectives while also meeting the needs of local stakeholders, for example local residents, fishermen and women, natural history groups, rangers and government representatives.

The coordinators are keen that any INTERCAFE field trip is not simply an extractive process, meeting local people and taking from them ideas and issues for outside 'experts' to discuss and write about. Rather, INTERCAFE field trips are designed to ensure that an exchange of views and ideas takes place, with primacy being given to acknowledging and respecting the views and needs of local people.

INTERCAFE's field trips rely on participants engaging with and reflecting on:

- Observation
- Written and visual data (maps, figures, charts, leaflets etc)
- Interaction with local stakeholders

The process of reflection from Saxony involves a draft report being agreed within the WGs and host country organisers (via email) and then sent to the local stakeholders for their comments before being finalised.

At the time of writing, the collected results from WG's write-up of the Saxony field trip are being edited. But the field trips have come across as rewarding, useful experiences where the different perspectives from INTERCAFE's participants provide a relevant case study from the perspective of both natural and social scientists.

Part of the preparation for the upcoming trip to Israel might usefully involve reflection on four field trips that were similar in some ways but which had important differences, two from REDCAFE (Denmark and UK) and two from INTERCAFE (Poland and Germany). Using questionnaires and email survey to involve INTERCAFE participants would help to highlight key messages about how to increase the value of field trips.

A small but perhaps important point concerns the potential that may exist for capacity building within INTERCAFE. Field trips show up more than other activities the extent to which individual participants use their own perspectives and 'world views' to frame observations, interpret written and visual data, and identify questions with local stakeholders. It is almost as if the interdisciplinarity that is emerging through meetings, breaks down a little without the discipline of the workshop environment.

There may be scope for looking at the role of field trips from an inter-disciplinary perspective through some conflict management and conflict analysis tools. Capacity building (e.g. conflict analysis training) can provide a 'neutral' entry point for analysing a situation and possibly sharpening observation skills and people's ability to engage with local stakeholders from multiple perspectives.

(3) Conclusions

- The INTERCAFE Action is proceeding well and remains on track to deliver good quality outputs on the time scales anticipated. The objectives remain relevant and coherent. Management structures seem to be relevant and coordination/management teams seem to use time efficiently and effectively. Communications are very good.

- The coordinators' focus on process, and the positive, friendly and empowering attitude among the management and coordination team are key Action strengths.

- The Action's interdisciplinary approach is working well. Working across WGs is proving successful and gaining momentum through experience and familiarity. Participants seem increasingly to appreciate and seek the diversity of perspectives in the group to advance collective outputs.

- There is scope for identifying individuals who feel less able to work in inter-disciplinary settings than others and perhaps working one-on-one with them to see if there is any support that could be offered within the Action to encourage them. This is especially the case for field trips.

- Some participants approach field trips mainly from the perspective of their own discipline. It would be useful to design a participatory process for reflecting on several field trips in order to focus the group even more on the added value from INTERCAFE's approach to field trips and the role of different perspectives in effective multi-stakeholder dialogue.

- It may be helpful for the Steering Committee to discuss how to share responsibilities to achieve post-meeting objectives and follow-up in more realistic timescales.

APPENDIX 1: Datasheet available to input data into the Water Systems Database

NAME OF RESPONDENT:	Stef van Rijn	
COUNTRY:	The Netherlands	
NAME OF SITE:	Markermeer	
Issue	**specification**	**DATA**
HABITAT-TYPE	see README	3
LOCATION	Greenwich coordinates	52.35N,5.15E
REFERENCE(S) OF STUDY	peer / non-peer reviewed / anecdotal*	peer
PERIOD OF STUDY (give range)	year(s)	1996-2000
SUB-SPECIES	carbo / sinensis*	sinensis
NUMBER OF CORMORANTS INVOLVED	maximum	15,000
NUMBER OF CORMORANTS INVOLVED	birddays per year	680,000
STATUS OF CORMORANTS	breeding / non-breeding*	breeding
FLOCK SIZE AT TIMES OF FISHING	average number of Cormorants	1000
OCCURRENCE OF MASS FISHING	yes / no*	yes
JUVENILES	% of number	12
SIZE OF FISHING WATER	Km^2	700
WATERBODY	natural / semi-natural / artificial*	semi-natural
DEPTH	m	3.5
TROPHIC STATUS	oligotrophic / mesotrophic / eutrophic*	eutrophic
TURBIDITY (SECCHI DEPTH)	m	0.5
FISH SPECIES IN AREA	number	36
FISH SPECIES / GROUP MOST ABUNDANT (rank 1)	latin name	Abramis brama
FISH SPECIES / GROUP MOST ABUNDANT (rank 2)	latin name	Osmerus eperlanus
FISH SPECIES / GROUP MOST ABUNDANT (rank 3)	latin name	Gymnocephalus cernuus
OVERALL FISH BIOMASS	Kg/ha	115
DENSITY OF MOST ABUNDANT SPECIES (rank 1)	Kg/ha	50
DENSITY OF MOST ABUNDANT SPECIES (rank 2)	Kg/ha	40
DENSITY OF MOST ABUNDANT SPECIES (rank 3)	Kg/ha	15
FISH SPECIES IN DIET	number	14
FISH SPECIES / GROUP EATEN MOST (rank 1)	latin name	Gymnocephalus cernuus
FISH SPECIES / GROUP EATEN MOST (rank 2)	latin name	Perca fluviatilis
FISH SPECIES / GROUP EATEN MOST (rank 3)	latin name	Rutilis rutilis
DENSITY OF MOST EATEN SPECIES (rank 1)	Kg/ha	15
DENSITY OF MOST EATEN SPECIES (rank 2)	Kg/ha	5
DENSITY OF MOST EATEN SPECIES (rank 3)	Kg/ha	3
OVERALL CONSUMPTION (all fish species)	% taken from available (Kg/ha)	4.4
CONSUMPTION OF MOST EATEN SPECIES (1-3)	% taken from available (Kg/ha)	16.5
DISTANCE OF COLONY OR ROOST TO FISHING WATER	Km	3
DISTANCE TO NEAREST COLONY OR ROOST	Km	14
DISTANCE TO NEAREST ALTERNATIVE FISHING WATER(S)	Km	7
COLONY / ROOST EXISTENCE	number of years	23
COLONY / ROOST HABITAT	willow / poplar	willow
	alder / birch	
	ash / oak / beech / birch / lime	
	coniferous	
	ground nesting	
	other	
POPULATION INCREASE OR DECREASE	% average last 5 years (- = decrease, + = increase)	0